THE CARE OF SOUTH PACIFIC ARTIFACTS

Basic Conservation and Museology for the Nonspecialist

An Annotated Bibliography

by

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for the
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PREFACE

The immediate aim of this work is to fill the Plan B Major Paper requirement for the Master of Arts degree. The long term goal is to provide a published volume, a layman's guide to curatorial conservation literature relative to 1) South Pacific artifacts and 2) a hot-humid tropical climate. My focus is the care of organic substances since they degrade so rapidly in this type of climate and because they are all but ignored in the literature currently available.

In researching the literature I became aware of the need for a thoroughly annotated guide; one can waste a considerable amount of time hunting for information which is applicable to island substances and a hot-humid climate. While there is a wealth of material on the conservation of western/European fine arts, such as oil paintings, marble statuary, and porcelains, there is extremely little on Pacific arts such as barkcloth, fiber mats and featherwork.

The concept and practice of curatorial conservation developed in Europe, in a temperate climate. Therefore, when applied to the very different media and climate of the South Pacific, European conservation methodology frequently lacks relevancy. The extreme scarcity of island-specific conservation literature further complicates problems for the museum nonspecialist and private collector who are already disadvantaged by fragile media and hostile climate, and who lack formal training. While overseas museums may offer training programs the fees and related expenses can be greater than small museums can bear.

The emerging island nations of the South Pacific demonstrate increasing interest in the preservation of their cultural properties and in the educational role of museums. Because of scale and budget these museums may not at first be able to afford total atmospheric control systems and thoroughly equipped laboratories staffed by professional technicians. Yet the conservation of organic substances in the hot-humid tropics is an almost impossible task under the best of conditions.

The layman conservators need a guide such as this paper provides to facilitate research and selection of useful material; it is not always evident from reading a book review or table of contents how well or extensively subjects are covered by a given volume. Moreover, while certain organic substances such as wood may be included in quite a few volumes, the suggested treatments for it may require unavailable equipment and expertise.

Literature herein annotated was selected by Dr. Anthony E. Werner, internationally recognized conservator and chairman of the Pacific Regional Conservation Center, Bernice Pauahi Bishop Museum, Honolulu, Hawai'i. While coverage of various subjects is incomplete or missing altogether, the four sources nevertheless represent, to Dr. Werner's knowledge, the best textual material extant.

This work was motivated by my admiration for Pacific islanders, their material culture, and those artists whose creations I find so moving.

In my annotation of the literature I adopted an informal style, including use of the second person. This was in consideration of 1) the nonspecialist with English as a second language, 2) the complex subject matter, and 3) the great responsibility of the layman. Many in the field will depend almost entirely upon the literature for their education, and treating organic materials in the tropics is exacting enough without the added burden of distilling critical information from texts written in rarified language. Therefore I chose to interpret the material in a simpler way with a premium on clarity and accuracy.

Pacific islanders I have met possessed a single characteristic I appreciate, namely, their manner of communicating. Whether they offered technical information or personal observations, all were enthusiastic and cordial. In this offering I have followed the islanders' lead.

I thank my MA committee members, all of whom have lived and worked among Pacific islanders, for their acceptance of such an unconventional approach to a master's level work.

ACKNOWLEDGMENTS

Many people helped me with this work. Some were very generous with their time and advice. Notable among these is Dr. Anthony E. Werner, who loaned his personal volumes, answered questions over a two year period, and proof read and corrected the working draft.

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SANTA CRUZ CITY MUSEUM, SANTA CRUZ, CALIFORNIA

Ms. Sally Legakis, Registrar-Conservator

Mr. Charles Prentis, Director

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Mr. Jeffery Brown, Museum Scientist and instructor of curatorial conservation

Mr. James Deetze, Director

Mr. David Herod, Curator

Dr. Frank Norick, Principal Anthropologist, Pacific Specialist and Professor of Anthropology and Museology

Mr. Gene Prince, Museum Photographer

THE MARSHALL ISLANDS MUSEUM, MAJURO, THE MARSHALL ISLANDS

Mr. Gerald Knight, Curator

THE NATIONAL MUSEUM OF FIJI, SUVA FIJI

Mr. Fasiu Sione, former assistant to the Director

THE OAKLAND MUSEUM, OAKLAND, CALIFORNIA

Ms. Louise Revol, Associate Curator, History Department

UNIVERSITY OF CALIFORNIA AT SANTA CRUZ

Ms. Margaret Felts, Pacific Bibliographer,
Dean McHenry Library

UNIVERSITY OF HAWAI'I AT MANOA, HONOLULU

(Some material in this paper was drawn from lecture notes and assigned readings for the following formal courses:)

Arts of Hawai'i, Dr. Deborah Waite
Arts of the South Pacific, Dr. Waite
Building a Pacific Community, Dr. Robert Kiste
Geography of the Pacific, Dr. Peter Pirie
Man, Energy, and Island Ecology, Dr. Jan Newhouse

KUALOA ARCHAEOLOGICAL RESEARCH PROJECT
FOR THE CITY AND COUNTY OF HONOLULU, O'AHU, HAWAI'I

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Mr. Stephen D. Clark, Director and Archaeologist

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and Art History

EAST-WEST CENTER, HONOLULU, HAWAI'I

The Culture Learning Institute Library

Without the help of all these people this major paper would not be nearly so major.

FOOTNOTING, ABBREVIATIONS AND TERMS

Footnotes are indicated by number and appear at the end of chapters, sections and papers. For the Pacific Regional Conservation Center Bulletins, which are themselves numbered, footnotes are indicated by lower case alphabet letters.

ABBREVIATIONS

KARP...Kualoa Archaeological Research Project for the City and County of Honolulu, O'ahu, H.I.

PRCC...Pacific Regional Conservation Center, Bernice Pauahi Bishop Museum, Honolulu.

Bishop Museum...above institution.

Lowie Museum...The Lowie Museum of Anthropology, University of California at Berkeley.

The S.C. Museum...Santa Cruz City Museum, Santa Cruz, California.

Agrawal, Guldbeck and UNESCO...Use of the single name refers to its associated volume.

TERMS

"Translation"...the interpretation of otherwise unrelated material which renders it useful within the context of this paper.

"This paper"...refers to the major paper, per se, and not to annotated papers.

SOURCE MATERIAL ANNOTATED

BULLETINS ON CURATORIAL CONSERVATION
Pacific Regional Conservation Center
Bernice Pauahi Bishop Museum
P.O.Box 19000-A, Honolulu, Hawai'i, 96819

CONSERVATION IN THE TROPICS
Proceedings of the Asia-Pacific Seminar on Conservation of Cultural Property Feb. 7-16, 1972
O.P.Agrawal, editor
International Centre [sic] for Conservation, Rome, Italy

THE CARE OF HISTORICAL COLLECTIONS:
A Handbook for the Nonspecialist
Per E. Guldbeck
The American Association for State and Local History
Nashville, Tennessee 1972

UNESCO
THE CONSERVATION OF CULTURAL PROPERTY
With Special Reference to Tropical Conditions
Place de Fontenoy, Paris-7^{e} France 1968

BULLETINS ON CURATORIAL CONSERVATION

Pacific Regional Conservation Center
Bernice Pauahi Bishop Museum
P.O.Box 19000-A
Honolulu, H.I. 96819 (no date)

BULLETIN NO. 1 MUSEUM CLIMATOLOGY

1. Introduction
2. Water Vapour [sic]
3. Causes of Damage
4. Prevention of Damage
5. Control of Relative Humidity
6. Measurement of Relative Humidity
7. Pollutants and Dirt

BULLETIN NO. 2 CONSERVATION AND MUSEUM LIGHTING

1. Introduction
2. Damage
3. Protection
4. Removal of Ultraviolet
5. Level of Illumination
6. Heat from Light Sources

BULLETIN NO. 3 TOXICITY OF CHEMICALS USED IN CONSERVATION

1. Introduction
2. Organic Solvents
3. Dangerous Chemicals
4. Modern Adhesives and Resins
5. Insecticides
6. Flammable Chemicals

BULLETIN NO. 8 PROTECTION AGAINST MOLD GROWTH

1. Introduction
2. Environmental Control
3. Evidence of Mold Growth
4. Fungicides
5. Fumigation
6. Control of Lichen and Algal Growth

BULLETIN NO. 9 CONTROL OF INSECT INFESTATION

1. Introduction
2. Types of Insects
3. Preventive Measures
4. Use of Insecticides
5. Fumigation
6. Precautions in the Use of Insecticides
7. Precautions in Fumigation

BULLETIN NO. 10 MATTING AND FRAMING WORKS OF ART ON PAPER

1. Introduction
2. Adhesives
3. The Mat
4. Making the Mat
5. Hinges
6. Preparing for Storage
7. Framing the Object

BULLETIN NO. 11 A SELECT BIBLIOGRAPHY FOR CURATORIAL CONSERVATION

Your museum may join PRCC and receive a complimentary set of these excellent bulletins.

PRCC BULLETIN NO. 1 CLIMATOLOGY

1. Introduction. This short section states the purpose of the bulletin. The main topics are: deterioration of objects in an uncontrolled museum environment; principals of atmospheric control; and conditions causing damage to objects.

2. Water Vapour. Section two defines AH (Absolute Humidity) and RH (Relative Humidity). A clear explanation of conditions upon which RH depends precedes a brief formula for determining the rise of middle range RH. This rise is relative to increases in temperature.[a]

3. Causes of Damage. This section lists a variety of undesirable reactions occuring in many organic substances due to extreme amounts and/or rates of moisture absorption and release. For instance, wood cracks and warps, vegetable adhesives soften or dry out, and natural fibers may become so embrittled that they turn into powder.

4. Prevention of Damage. The focus is on control of RH. Safe percentages relative to temperature ranges are given.

5. Control of Relative Humidity. Simple and economic methods of control are presented, e.g., area control with individual units as compared to total control with a large central unit. The four units mentioned are two humidifiers and two dehumidifiers. Silica gel, water absorbing granules, is cited as a measure for the control of humidity in closed exhibition cases.[b]

FOOTNOTES

a. Unfortunately, the ideal RH range falls far below the highs found in hot-humid tropical climates where and 80% RH can occur most of the year.

b. Silica gel , if not replaced immediately upon absorption of water, simply holds the water for reabsorption into the air. For this reason Mr. Jeffery Brown does not regard it as a suitable RH control as it requires almost continual maintenance.* Many museums prefer instead the modification of existing cases to allow for the escape of heated air through a strong screen or lattice at the top. Fans may be used to direct heated air away from artifacts on display in open spaces, especially those lit by incandescent lamps. Small, well hidden fans may be placed within cases where lights generate heat; this will insure air circulation and thus prevent mold growth.

In former times artifacts were stored in areas of the Fiji Museum having no atmospheric control and windows which permitted entry of light and heat during the days and rapid heat loss in the coolest months. This put enormous internal stress on organic substances. Upon fumigating this area and subsequent handling of objects with surface paint the paint powdered and flaked off at the touch. Adhesives degraded so that composite objects lost shell inlays and other attached substances. One could not say if all the damage was due to the uncontrolled atmosphere, the fumigant or both.**

* Pers. comm. July 21, 1981.
** Pers. comm. May 2, 1981, Mr. Fasiu Sione.

PRCC BULLETIN NO. 2 CONSERVATION AND MUSEUM LIGHTING

1 Introduction. Many types of museum objects are susceptible to the damaging effects of photochemical reactions caused by light. Two aspects must be considered in evaluating lighting---the qualitative, or type of light, and the quantitative, or amount of light.

2. Damage. Objects and substances are nonsensitive, moderately sensitive, or very sensitive to light damage; feathers are very sensitive while stone is nonsensitive. Listed with various objects such as tapa, textiles, unpainted wood, and skins are the types of damage they sustain. Also given are the U.S. and English measurements of illumination levels and the simple formula for calculating measure of exposure to light.

3. Protection. Three rules are presented to reduce amounts and rate of light damage. One rule embodies the qualitative aspect while the others deal with the quantitive.

4. Removal of Ultraviolet. Remove as much of this damaging component of light as possible. You cannot see UV rays but you see the damage they cause. Included are UV screening materials, brand names and countries of origin. Both materials and use are correlated to natural light entering through windows and to fluorescent and tungsten halogen lamps.

5. Level of Illumination. Levels are given for substances/objects listed in the three categories of sensitivity to light.[a] Emphasis is placed on the exclusion of all direct light from sun and sky unless it is reflected.

6. Heat from Light Sources. Thermal radiation, or heat, is generated by light sources. The sun's rays and incandescent lamps pose the biggest problems. Organic substances are very susceptible to heat damage; they dry out. Place light sources with high thermal radiation at a safe distance from artifacts.[b] If you must use hot lamps then you must also use heat filters.

FOOTNOTES

a. Use the data in this section before designing the lighting for a new museum or modifying that which you now have.

b. As air heats up more and more moisture is drawn from organic, porous substances. While the listed lux levels may at first seem too low---they are not; you must keep the heat down so keep the lights down. Areas just inside museum entrances should be used for the display of objects nonsensitive to light damage. This area should have intermediate lighting to allow visitors entering from the bright tropical light a space for adjusting their eyes to lower light levels. Inner exhibit space has the lowest levels and the light sensitive objects.

BULLETIN NO. 3
TOXICITY OF CHEMICALS USED IN CONSERVATION

1. Introduction. Conservators must work with some potentially hazardous chemicals. This bulletin covers precautions for safe use and recognizes that persons with allergies may have adverse reactions to particular chemicals. Organic solvents pose problems if used over a long period of time.

2. Organic Solvents. Solvents listed here are considered from the viewpoint of toxicity. Section two identifies those needing fume hoods or special extraction equipment, those regarded as relatively non-toxic, one type which can produce a poisonous gas, and those which should be totally banned from general use.[a]

3. Dangerous Chemicals. DO NOT SKIP THIS SECTION. Study the effects of these chemicals and memorize the first aid treatments given for both acid and alkali burns.

4. Modern Adhesives and Resins. These substances can injure you---read this section closely.

5. Insecticides. Contact and/or inhalation of some insecticides may be toxic. One mentioned is a cumulative liver poison; don't take chances with it.[b]

6. Flammable Chemicals. You must have the right types of fire extinguishers and DON'T SMOKE IN THE WORKSHOP, THE LABORATORY OR ANY TEMPORARY CONSERVATION AREA.

FOOTNOTES

a. In the event you decide not to purchase this bulletin you should have the following information:

DO NOT USE.....benzene
dioxane
nitrobenzene
carbon tetrachloroethane
pyridine

You should get this bulletin.

b. This is paradichlorobenzene.

BULLETIN NO. 4 STORAGE AND HANDLING
OF MUSEUM COLLECTIONS

1. Introduction offers guiding principles relative to the bulletin topic.

2. Nature of the Collection. Identified are the broad categories into which museum collections are normally divided such as natural history, anthropology and the arts.

3. Climatic Requirements. The most important factor in the protection of organic materials is the control of RH. To gain atmospheric control in particular areas, when no general air conditioning can be installed, you may want to use the types of devices mentioned. Air circulation and the siting of storage areas are discussed. Included is helpful information for the prevention of mold growth.

4. Lighting Requirements. You will learn what to do---and what to avoid doing. For instance, when planning a museum structure, do not include windows in the storage areas.

5. Cleanliness. You cannot simply fumigate articles and and store them without their being covered. This section tells you how to bag, secure and label your items. Twice-a-year fumigation will keep your bug population in check; this is true only if you are strict in keeping unfumigated materials out of the museum structures, and keep windows closed, storage sealed, and so on.

6. Safety and Security. Insure conditions which will keep your collections safe from theft and fire; the main procedures and practices you need to follow are included.

7. Read this part before purchasing your first shelf; it will probably save you time, labor and expense.

8. Storage Methods. To store small and flat objects correctly you need the methods described in this section. It gives advice on use of drawers, trays, and boxes.[a] Both general and specific needs are covered with an emphasis on solutions which are practical and convenient. Following this advice will help you when objects need to be located in a hurry.

9. Listed are seven rules for standard procedure in the safe handling of museum objects.

10. Conclusion.

FOOTNOTES

a. Pacific weavings, plaitings, and tapa (barkcloth) should be wrapped in acid-free tissue paper and stored flat. Items which are too large are placed on acid-free rollers, covered with plastic "sleeves" (tubes) and secured at both ends with plastic pull-straps. If stored atop cabinets, etc., make sure the I.D. tags dangle free so that you can locate the piece you want easily. These tags should bear photographs.*

* Pers. comm. David Herod, April 2, 1979

BULLETIN NO. 5 CARE OF LEATHER BOOKBINDINGS

Although this information does not apply to a substance found in island cultures prior to European contact, you may profit by becoming familiar with methods used to conserve leather if you have bound volumes in your archives.

BULLETIN NO. 6 FEDERAL FUNDS FOR CONSERVATION

This refers to U.S. government funds. Those of you on Pacific islands may or may not be qualified to receive them.

BULLETIN NO. 7 THE CARE OF TAPA

IF YOU HAVE BARKCLOTH YOU CANNOT DO WITHOUT THIS WORK. It is the only source on the care of tapa of which Dr. Werner and myself are aware.

Covered is the handling, storage, and display of tapa. There is also information on cleaning; NEVER USE WATER OR ANY OTHER SOLVENTS.

Although tapa is surprizingly strong and durable, it is easily ruined by improper handling and conservation treatments. For instance, both paper and tapa derive from plant fibers/bast and are, therefore, cellulosic as far as the structural make up is concerned. However, you cannot conserver tapa as if it were paper---you will destroy it.[a]

FOOTNOTES

a. Do not use liquids, including water, even to lightly brush tapa. Secure a fine-meshed net over the top of a tapa which is spread out on a table large enough to support it properly; do not let the fabric hang over the sides. Vacuum through the net with a hand vacuum not a floor model. The suction should not be strong enough to disturb flaking paint or varnish, but strong enough just to dislodge the dust. You might use a soft brush to lightly dust plain, undecorated or simply dyed pieces, but guard against the bristles disturbing loosened fibers and dried out layers.

BULLETIN NO. 8 PROTECTION AGAINST MOLD GROWTH

Mold is a formidable foe in the hot-humid tropics and is extremely difficult to control. It is much better to prevent its growth; these cryptogamic plants are hard to eliminate once they have a start.[a] Fumigation of objects in a thymol chamber is a long established treatment. Directions tell you how to make your own such chamber from a discarded refrigerator---only the light inside need work.[b] This bulletin is excellent and very easy to read.

FOOTNOTES

a. Molds pose the most insidious threat to substances since they cannot be visually detected until they are already causing damage; the spores are too tiny to see. You must keep that air circulating so that spores are unable to settle down for a meal. And when handling objects do wear cotton gloves (making sure they are washed on a regular basis). The oil from one fingerprint provides nutrient material for mold; without gloves on you are literally providing feasts for your enemies.

b. Jeffery Brown does not favor the use of thymol and states that the current trend in museum conservation is away from this well-known method.* David Herod favors using thymol fumigation and finds it especially useful in a small lab situation.*

* Pers. comm. May 11, 1983
* Pers. comm. June 20,1983

BULLETIN NO. 9 CONTROL OF INSECT PESTS

1. Introduction. This section gives a list of insect pests which attack organic substances. It strongly advocates "good housekeeping", i.e., routine checks and cleaning of storage areas and collections, periodic use of biocides, and just plain good sense cleanliness in general.[a]

2. Types of Insects. Six types of insects and the materials they attack are listed. The emphasis is on combating insects in their active stages. Not all insecticides will kill insects in all of their life cycle stages.

3. Preventative Measures. The practices offered, if strictly adopted, can give you the upper hand in the continous fight against insect pests. These practices should be regarded as rules if you are serious about control.

4. Use of Insecticides. Note well those compounds which are already prohibited from use in some countries.[b] There are enough safe compounds listed to cover your needs. The U.S. produces an impregnated material called "VAPONA" No-Pest Strip. This product, while used in many museums, has become controversial.[b]

5. Fumigation. For small operations you can choose between four suggested fumigants; both the chemical compounds and the trade names under which they are marketed are listed.[c] Five approaches to large scale fumigation are discussed. While three of these methods require special chambers, one operation can be carried out in a sealed trash can. The fifth, part of the trash can technique, requires only a dish.

6. Precautions in the Use of Insecticides. Human beings also absorb insecticide vapors and so will all the other organic substances in your museum. Follow PRCC advice for safety in using these dangerous compounds. NOTE WELL that all vapors must be removed via ventialtion before a previously treated object is moved or examined.[d]

7. Precaution in Fumigation. In many countries <u>methyl bromide</u> and <u>sulfuryl flouride</u> (trade name "VIKANE") can be used only by licensed fumigators. These compounds require professional handling; they are extrememly dangerous.

PLEASE DO NOT IGNORE THESE WARNINGS

a. This advice is good for museums in general and absolutely critical for those in the tropics. Unfortunately, human beings are not famous for problem-prevention, but they have earned quite a reputation for being willing to spend energy, time and money on problem-cures. It is so much easier to simply avoid many of the disasterous effects of neglecting good housekeeping---keep it clean.

b. WARNING---if using "VAPONA" in closed drawers and so on, you must air both the containers and the contents from time to time. The intensity of the insecticide, when so contained, will build up over time. Also, do not hang the strip in closed areas where people are likely to be. The label on this product does NOT specify it for museum use.*

c. Do not allow objects into your museum (that is in any part of the structure except the fumigation area) untill they are examined for dirt, insects, larvae, mold and other contamination. Fumigate first and ask questions later.

d. Pay strict attention to prevailing winds in your area. Where are noxious fumes from the lab being carried? What happens when the winds do not blow or reverse their usual direction? You are responsible for all dangerous wastes.

* Pers. Comm. Jeffery Brown, May 11, 1983

BULLETIN NO. 10 MATTING AND FRAMING WORKS OR ART ON PAPER

Use this advice for your archival materials.

BULLETIN NO. 11 A SELECT BIBLIOGRAPHY FOR CURATORIAL CONSERVATION

Some of the listed literature is free and prices are given for the rest. Some publications are by now out of print.[a]

FOOTNOTES

a. It is futile to identifiy publications available at this writing simply because any of them can go out of print momentarily. Contact a reputable bookstore or publishers. Should you wish to trace an out of print book try a professional book-searcher. A copy of the volume(s) you seek may be found in a warehouse or even a used book store. Be sure to inquire if there is a fee involved (quite common) before you place your order.

Conservation in the Tropics Proceedings of the Asia-Pacific Seminar on Conservation of Cultural Property Feb. 7-16, 1972 O.P. Agrawal, editor International Centre sic for Conservation, Rome, Italy

"Climate and the Museum in the Tropics" Garry Thomson

"Tropical Climate and New Concrete Building for a Museum" Kenzo Toishi

"Climate and Museum Architecture in the Tropics" Smita J. Baxi

"Design of a Museum Building and Preservation" Swarnakamal Bhomik

"Biodeterioration of Museum Materials in Tropical Countries" S.M. Nair

"Some Thoughts on Training in Conservation" Paul Philippot

Only those papers which most closely relate to my topic are annotated. However, the Philippot paper addresses conservation and museology basics.

"Climate and the Museum in the Tropics"
Garry Thomson

Indoor Relative Humidity
New Buildings
1. Shading
2. Reflection
3. Ventilation
4. Low Thermal Capacity
Airconditioning [sic]
Local and Limited Control
Dehumidification
Lighting
Bibliography
Discussions

Thomson's paper is easy to understand, practical, and a basic guide to the major areas of museology and conservation with special considerations for tropical problems. He discusses the undesirable effects of too high an RH in the general (geographic) climate, and also in particular microclimates.

The author reviews museum architecture designed to reduce solar heat gain through proper use of approaches one through four, above. Note well the "greenhouse effect", the term for an architectural approach to trapping heat---you want to avoid it, of course.[1] Thomson is quite thorough; he even considers building placement in relation to prevailing wind direction.[2]

Don't miss the author's views on air conditioning, "free ventilation", total environmental control, and limited control.[3] Whichever method or methods you choose, you will need devices for measuring the RH. Basic measuring instruments are described in this section. Included also are three remedies for bad air circulation.

Light, a powerful damaging agent, has distinct properties and behaves in predictable ways. Its uses and control are critical to successful conservation. Light measuring de- are listed along with a discussion on the best museum and exhibition lighting for the tropics. Various types of illumination, both natural (the sun) and artificial (lamps), UV filtering techniques, and three rules for superior lighting are cited.

The author includes brand names of cited materials and their availability through manufacturers. Many diagrams, charts and photographs illustrate his exceptional paper and the "Discussion" section which follows should not be missed.

1. This effect is common in contemporary homes and public buildings. Familiarity with one of these homes in Honolulu allowed me to observe that the increased amounts of heat and humidity were noticable and gave an effect which was exactly opposite to the one needed.

2. Pacific islanders have taken advantage of natural air conditioning (the breeze) for thousands of years. However, this form of "free ventilation", while helping to cool structures with well-circulated air, consists of uncleaned air. We see this in contemporary museums and those located on main traffic arteries invite damaging gasses and the dirt of "road grease" into their buildings. Obviously, the galleries exhibiting articles from the collection can not escape the noxious fumes and filth. To these hazards we must add continual vibrations from heavy trucks, busses, and motorcucles; these vibrations put stress on objects and the visitors as well.

3. Properly used, the term 'air conditioning' means filtered and cleansed air. Today the term is loosely applied to the control of relative humidity through the control of temperature and may not include conditioned air unless so stated.

"Climate and Museum Architecture in the Tropics"
Smita J. Baxi

Introduction
Climate Types
1. Hot-Dry Zone
Measures for Protection (11 categories)
2. Hot and Humid Zone
Measures for Protection (seven categories)
Conclusion

Protective Measures
Control of solar radiation
Ventilation
Walls
Roof
Windows
Courtyards
Protection from moisture
Protection from wind
Air conditioning
Ceiling heights
Planning in general
Lighting

The author's emphasis is on initial planning. Although he may be focusing on larger structures than you already have or are planning, this sort of information is basic enough to be adapted to a variety of needs.

Baxi uses clear language to make many technical points you need to consider; you can "translate" to suit them to your needs when necessary.

Architectural approaches concerning the function of various design features and the protection offered by each are discussed in detail. Eight photos illustrate different window treatments; each is designed to offer particular advantages.[1]

Problems are clearly identified and possible solutions for them are offered. Also of great importance---Baxi tells you what to avoid.

Here is an information-packed paper. However, you will notice that the author's remarks seem more suited to the continental and "high" islands than to atolls.

FOOTNOTES

1. The two major considerations influencing your choice of window treatment are security and protection against the admission of excessive light. Your storage rooms must not have windows. Your laboratory or workshop may have windows if the light they admit is totally controlled.

"Design of a Museum Building and Preservation"
Swarnakamal Bhomik

Early in his paper the author addresses a growing trend in museum planning, namely, that of selecting only those building designs which reflect the major architectural styles already established in the area or the community. To be sure, visual harmony in any landscape is to be desired from a purely aesthetic viewpoint. However, should the goal of architectural continuity take precedence over the goal of museums to insure protection of the collection?[1] Bhomik does not believe so, nor do most other author-experts.

A wealth of practical information is presented to help you develop successful museum planning. The material under "Design and Site" is especially good but must be "translated" for use in the Pacific. Not only is the design of structures covered but the problems which occur within them as well. Some of the latter are: contaminated air, the threat of insect pest damage, and the undesirable effects of excess heat and unwanted dampness.

Most of the museum problems related to conservation can be lessened or eliminated entirely by carefull planning. For instance, Bhomik offers sound advice about treatment of the ground around your proposed museum building site; treat it for termites before construction begins. (If construction has already begun you may still use this treatment.)

Be carefull in your choice of construction materials. No reasonable person will suggest that you must have only the best of everything; few museums can afford this approach. However, you must be particularly aware of which materials will hold up to the tough tropical climate, insects, molds, extreme RH, and so on.

There is another and ultimately depressing threat---man. Bhomik does not ignore this fact and includes a discussion of structural designs developed to withstand the dangers of armed conflict.[2]

The author lists brand names of lamps and UV filters which he considers best for museum lighting. His paper is greatly satisfying in that it gives a solution for every problem identified.

"Translate" the suggestion to place iron security bars over glass windows. Iron rusts very quickly in air which is heavily contaminated with <u>sodium chloride</u> (salt). Use an alternative metal such as bronze.[3]

FOOTNOTES

1. Professional planning and follow-through will earn for your museum the respect you want it to have. Do not allow well-meaning but untrained and unqualified persons to influence decisions concerning museum building design, policy, or any other important matter. A museum is in need of business -like management if it is to prosper.

2. Does armed conflict seem unlikely? I sincerely hope it will not occur, but do read this part of the paper. Of course, weapons have changed since this was written.

3. You might contact PRCC to learn if any new materials have been developed which will successfully substitute for salt-resistant metals such as bronze; bronze is expensive. I mention it because it is excellent for this purpose and in case funding is no problem.

"Biodeterioration of Museum Materials
in Tropical Countries" S,M, Nair

Introduction
Symptoms of Biodeterioration
(Tables I and II)
Damage Caused by Insects
(Table III)
Damage Due to Cryptogamic Plant Growth
The Prevention and Control of Biodeterioration
Preventive Measures
(Table IV)
Chemical Treatment Given to Objects
Use of Chemicals Within Display and Storage Units
Control Measures
Biocides for the Eradication of Insects
General Considerations
References
Discussions

Data presented by Tables:

I (does not apply to the South Pacific)

II Symptoms of biodeterioration and examples of causes.

III Types of insect pests found attacking museum objects, the life cycle stages at which they are dangerous, and the nature of damage caused.

IV Common cryptogamic plant growth.

Nair offers a definition by which biodeterioration may be distinguished from other causes of damage to museum objects and substances in general.[1] The author admits that gaps in the fundamental knowledge of this process do exist, but gives an admirable presentation of avaialable data in this paper.

Biodeterioration is a term covering all damage done by life forms, e.g., insects, plant growths and animals, with the exception of man. Nair compares the damage done by these agents in a temperate climate to that done in the tropics and finds the latter to be of enormous porportions.[2]

Be sure to study the section, "Use of Chemicals Within Display and Storage Units" and check the information against PRCC BULLETIN NO. 3 TOXICITY OF CHEMICALS USED IN CONSERVATION. Nair includes a list of well known insects pests and correlates them with the best biocides.

Do not overlook the "Discussions" section, particularly the remarks of Dr. Kenzo Tioshi of Japan.

FOOTNOTES

1. For instance, two other causes of undesirable changes in substances are the photochemical reactions generated by UV rays and the embrittlement of cellulosic materials due to excessive moisture loss.

2. Insect capability such as demonstrated by termites extends even to cement. In Hawai'i I have seen the effects of the coral borer, a fragile looking insect which can pulverized coraline algae. This limey encrustation may be partially removed from marine site artifacts by scraping, but this method is not recommended because risk of damage to the object is extremely high. Conservation treatment to remove this calcium carbonate algae requires an acid so fierce that only experts should attempt the technique.

3. Do not use lists such as Nair's in an uncritical manner. The author is certainly a recognized expert but you will want to compare information. Check this list against PRCC BULLETIN NO. 3. Also take into account the condition of your artifact; its fragility will determine which treatments should be avoided. Your procedure will also be dictated by the rarity of your piece; don't experiment with techniques you haven't mastered on rare objects. Should you conduct experiments on insignificant, expendable articles or fragments you must keep thorough records of all procedures; research must be documented. Should your work prove fruitful you can write it up as an artical thus sharing your findings with others in your field. And remember that documenting mistakes is very important; that is the way you avoid repeating failures.

"Some Thoughts on Training in Conservation"
Paul Philippot

Includes Discussions

Although these remarks refer to the formal training of conservators, Philippot's views are basic and can be "translated" from the specific to the general, from the professional to the nonspecialist. They can also be related to the South Pacific. The concepts put forth is this work should guide you in forming attitudes toward the role and responsibilites of any conservator.

Choice of trainees is of the utmost importance no matter how much or how little formal training they are to receive. The author's focus on individuals and their personal characteristics is an area most authors neglect, yet it is critical in the selection of any person for any position.

These individuals will be expected to reach the goals adopted by their museum. For instance, how much restoration is considered advisable with regard to the interpretation goals desired? Should the object reflect the skill of a given society's artists or should it reflect the visible wear of normal use? Much of the formal training required by a museum's staff is defined by the foregoing and other goals and not only by which programs are being offered at large museums and the fees being charged, costs of travel and living expenses and so on. Why bother to send conservators for specialized training if your museum requires only minimal restoration of artifacts? And do read the discussions.

"Tropical Climate and New Concrete Building for a Museum" Kenzo Toishi

The harmful effects of alkalinity released into the air by new concrete have been observed and investigated in Japan. A microclimate contaminated by excessive alkaline particles causes undesirable changes in various organic substances. The author mentions that silk, Japanese lacquer, hardened linseed oil, mineral pigments, and vegetable dyes are susceptible to damage.[1]

Toishi states that new concrete takes about a year to "season", i.e., to dry thoroughly. However, it seems that in Japan new concrete buildings require at least two summers to season.[2] Surplus water used in mixing the cement evaporates into the air during the drying period thus causing high humidity within the structure.

Toishi describes methods by which alkalinity levels may be detected. He advises that hair hygrometers can be adversely affected by excess alkalinity and, if so, can not be counted upon to give correct data. Until you new concrete is truly seasoned use all of these methods to measure alkalinity levels in the air.

Powerful air conditioning and ventilation are two countermeasures, but they are not totally effective when the building is still relatively new. This problem presents a very degrading microclimate for organic substances.

FOOTNOTES

1. Concrete as construction material is becoming more and more popular in the South Pacific. Excessive alkalinity Toishi tells us, has been found to be damaging to various materials ; these fall within the categories of protein (in chemical make up) and cellulosic (in structural make up). These facts will alert you concerning the development of problem-prevention strategy. You might conduct your own studies on Pacific vegetable gums and resins to begin with. Obviously, the full range of substances used in Pacific artifacts needs be tested for response to high alkalinity. Document experiments or simply observations thoroughly and report them to the PRCC or Dr. Toishi (write PRCC for his current address).

2. In hot and humid climates seasoning time should be less, but may depend heavily on seasonal rains such as monsoons and on force and duration of prevailing winds.

The Care of Historical Collections:

A Handbook for the Nonspecialist

Per E. Guldbeck

The American Association for State and Local History

Nashville, Tennessee 1972

CHAPTER 1 STORAGE

Although Guldbeck addresses the conservation of Early American cultural property, his advice is fundamental to basic conservation and museology. This chapter covers storage practices, placement of objects in relation to one another, best use of storage spaces of differing dimensions, lighting and the classification and location of stored objects. Because Guldbeck's information is basic and practical it is easily "translated" for use in the conservation of Pacific artifacts; some advice is also useful within the geographical Pacific context as well.

The author describes unsafe conditions which can lead to personal injury, to fires, and to particular circumstances which invite animal, insect and mold attacks.

Safety for museum personnel is greatly stressed. Not all hazardous situations are obvious, but once identified they can be avoided. For example,a test is described which reveals whether or not old movie film is of the nitrate-based variety. This type of film is potentially very dangerous. Guldbeck describes a second test for determining if such film has reached the critical stage in its chemical breakdown. I can become as dangerous as nitroglycerin---a powerful explosive. You have to know how to identify and handle this hazard.[1]

FOOTNOTES

1. You can be of significant public service by publishing informations and warnings of this sort in newspapers.

CHAPTER 2 SECURITY

Security is a major issue in protecting collections and is becoming more urgent with passing time. Guldbeck alerts the reader that danger to museum collections through theft is increasing. Collector demands for artifacts and current market values are both rising. To better protect your collections you must consider a variety of factors as contributing to the vulnerability of your museum such as the design of the biuldings and grounds. You need to remedy inadequate nighttime lighting, unsafe exhibition practices, unguarded exits, and the failure to record an object's whereabouts each time it is absent from its shelf or drawer.

The author offers criteria for selecting security personnel, for establishing liaison with the police, and for choosing security alarm systems. He discusses the use of guard dogs and stresses that museum guards deserve a decent wage.

Whether or not your budget includes the installation of elaborate security systems, good protection can be insured. Information under "Some Alarm Systems" will help you determine which you may prefer, but it is obvious that there are advantages and disadvantages to every approach. You may want to combine several. After reading descriptions of the five systems covered, you may decide to employ well-paid guards with well-trained dogs.

Guldbeck includes methods for the safe display of objects on exhibit, their supports, fastenings, and placements.

CHAPTER 3 FIRE PROTECTION

FIRE! (Before)---the advice you need to prevent fires is under "PREVENTIVE MEASURES".

FIRE! (During)---do you stay and fight it or do you get out immediately? In either case you must CALL THE FIRE DEPARTMENT FIRST.

FIRE! (After)---damage to collections may also result from water and water-based extinguishers so begin to attend to fire prevention right now.

Fires are not all the same and neither are the methods of fighting them; the type of fire (electrical, grease, chemical, etc.) determines the method of fighting it. Sizes, numbers, types, and locations of extinguishers are all equally important. Study these lists carefully, examine your extinguishers and make necessary substitutions.

Note the undependable types of extinguishers Guldbeck cites.

If you already own the obsolete carbon tetrachloride extinguisher---GET RID OF IT. The fumes alone can cause liver and kidney damage at least, and they can kill you at worst. This substance when coupled with heated zinc metal will form an explosive compound.

The author's message is made very clearly---

PERSONAL SAFETY COMES FIRST.

CHAPTER 4 ENVIRONMENT

Paradoxically, hostile microclimates inside museum structures can be more dangerous to cultural properties than the general climate out of doors. A 'climate' is simply any combination of humidity, heat, light, and air circulation. Climate is also known as 'atmosphere'. Atmospheres are found everywhere above and on the earth; there is the general geographic climate and individual microclimates both in and out of doors. The many combinations of climatic factors are called 'weather'.

Guldbeck explains how climatic factors combine and interact in ways which are ruinous to artifacts. We cannot do much about the weather outside but we can and must control the weather inside---inside rooms, within cases and drawers.[1] While the author does not directly address Pacific artifacts in this important chapter, the material he offers can be "translated" because he identifies those museum conditions which in general cause substance deterioration. He mentions types of damage due to excessive RH and the effects of extreme heat and dryness, the hazards of UV rays and polluted air, and the ever-present threat of mold growth.[2] Hostile micorclimates can be found even within museums possessing the most sophisticated environmental control. It really behooves you to study this chapter.[3] The author includes types and prices of units for dehumidification and humidification and for types of UV filters.

FOOTNOTES

1. The one major drawback concerning all atmospheric control systems is lack of wisdom concerning their use. You must not only understand what a given system will accomplish you must also identify the various microclimates throughout your museum. Your hygrometers will keep you informed on one of the key factors, i.e., RH. A wide variety of microclimates can and do occur within one area, that is, within the room itself, in cases, boxes and drawers.

2. Mold is extremely insidious. Do not assume that because it has never grown on your artifacts before that it never will. Go check them right now.

3. As for polluted air, do not forget that sodium chloride (salt) is a contaminat. If your air is heavily salt-laden I suggest you do not use natural air conditioning, e.g., "free" ventilation; the breezes will carry too much salt into your museum.

CHAPTER 5 PACKING

The author strongly advises against lending pieces from the collection.[1] Artifacts suffer greatly from stress due to travel. However, if you decide to lend, borrow, donate, sell or buy---if you must ship items for examination, authentication, conservation or restoration---you MUST pack and ship them safely. Minimize shipping dangers through using correct packing techniques. You can also avert loss due to misshipment by following Guldbeck's advice.

Under "EXAMINATION BEFORE SHIPMENT" the author warns that each piece must have its condition determined and recorded before packing procedures begin. Complete photographic and written documentation is necessary. Cited are a number of symptoms which constitute evidence that an object is not fit to travel---do not ignore them. Guldbeck mentions dangers peculiar to many types of artifacts. He also cites certain difficulties which may be encountered when attempting to mend various materials.

It is surprizing to learn how many procedures there are before packing begins. You must design the whole area, choose the proper insulators, oversee the construction of cases and make sure no one is using felt-tip markers. Believe me, you do not just choose items, wrap them, put them in boxes and make and end of it. You also must consider the RH in which your items, particularly porous and drier organic substances are packed as compared to the atmospheric conditions likely to be experienced during air or surface travel, and the RH needed to keep them safe at their destination.

Guldbeck includes quite a horror story with this section. It illustrates clearly the danger of assuming that everything will be alright at the receiving end. You must do all you can to insure timely, careful reception of your articles and professional handling of them while they are away from home. Give the persons in charge of them all the information they need about the substances in your objects and the type of care they must be given.

FOOTNOTES

1. Do not lend rare objects. And, if your pieces are truly unique---send a facsimile. You might send a movie, slides with an accompanying taped lecture; you might even send an expert to lecture---but keep your unique pieces under your care. If there should be damage or even loss a unique artifact cannot be replaced. (I use the word 'unique' denotatively, that is, to mean literally one of a kind.)

CHAPTER 6 THE ARTIFACT AND ITS DOCUMENTATION

A continuing problem for museums and private collectors is the forgery offered for sale; some of them are marvelously well executed and manage to slip past more than one expert.[1] This chapter offers sound advice on authentications and appraising. It "translates" for the South Pacific artifact. Adopt the basics presented by Guldbeck and save considerable time and money; you don't want to spend precious museum funds on a fake.

Although the questions themselves will vary per object, there are basic types of questions to ask before you consider the purchase of any article.[2]

For those artifacts already in your holdings with little or poor documentation, further identification may be obtained from local experts and resource persons.[3] If you or the other staff members are not sufficiently knowledgeable to authenticate particular objects, do seek help.[4] Even a rare piece has no monetary value unless it can be identified; the more documentation a piece has the more the piece is worth. This is true from the standpoint of history, anthropology, religion, economics, etc.; I am not just citing monetary values.

FOOTNOTES

1. Fakes are offered to prestigeous institutions with highly trained experts as well as to private collectors. To be deceived by a very good fake is not all that uncommon.

As a general rule use caution with strangers and verify letters of introduction and artifact vouchers with the authors of such documents. Beware the person claiming to be an accredited appraiser of South Pacific art---AT PRESENT THERE IS NO INTERNAIONALLY RECOGNIZED BODY OR INSTITUTION WHICH GIVES THIS CREDENTIAL. Contact museums with large South Pacific collections and ask which expert they use to authenticate and appraise their objects.

2. Most museums rely on their own and other curators, art historians, anthropologists, archaeologists, and both private and commercial resource persons. You may also get help from mature students doing research at the graduate level. University libraries have reference specialists which are able to at least direct you to instructive literature.

3. Local experts and resource persons are generally found among the elders of a society. Many elders have first-hand experience with local artifacts, especially household and other utilitarian items. Record the person's age, history, and experience or other source of knowledge concerning any article; this may serve to support credibility.

4. If you cannot find local help in this matter perhaps there is an expert elsewhere who will agree to study photographs of your items. While this method will probably not result in positive identifications, you may be given referrals and other useful information. Do not send color or black and white photos; send slides. Slides can be projected on a screen and the size of the image increased many times to study details. Shoot the piece from many angles, keeping written records of each shot as you go. Use floodlamps and shoot indoors with a plain background, but turn on lights only long enough to set up your shot---then include the objects. Use heat filters.

CHAPTER 7 THE WORKSHOP AND ITS USE

It seems to me that almost any person engaged in conservation can benefit from this discussion of the workshop, its furnishings, and tools. Guldbeck is very supportive and stresses that proper attitude is absolutely necessary to successful conservation. For instance, it is critical that you know when to stop treatment, know when a project is beyond your capability and to ask an expert for help.

Many of you may not be able to assemble the ideal workshop the author describes and some of you will need only a modified version. However, it is well to be aware of what an ideal conservation lab is like so that you can equip your own work space in the best way. Once you know about lighting, equipment, safety, and the documentation of treatments you can furnish your lab all at once or in stages.[1]

READ THE SECTION ON SAFETY.[2] Even if your lab does not come under the jurisdiction of enforceable fire regulations you must establish your own strict policies designed to avoid fires. Guldbeck covers all of the danger areas; he's on your side, so don't skip a word.

Certain chemical reactions are violent. Some are deadly---acids and alkalis can eat up your skin. And just because fumes do not instantly knock you over do not assume that they are safe. Fumes accumulate. Keep your lab well ventilated and use a fume hood.

FOOTNOTES

1. One type of operation you may want to carry out is that of making facsimiles, or molds and castings, of unique objects within the museum collection for use as educational materials. Facsimiles should be made of private collector's rare and unique pieces whenever permission is obtained. One artifact, an old temple image in a unique style, was destroyed by fire shortly after the owner had finally (after years of requests from Bishop Museum experts) agreed to allowing the facsimile to be made.* Persevere in your efforts to obtained documentation on pieces in private collections even if only photographs, measurements, weights and other pertinent data.

2. While some museums on continents and "high" islands do have irresponsible policy regarding the disposal of dangerous chemicals, those located on atolls absolutely can NOT. Rainwater and all other liquids leach (drain) through coral and coral is the calcareous "rock" from which atolls are built. These islands have no fresh water of their own except that provided by rain (unless solar stills are used or like Nauru, it is imported by ship). Rainwater leaches underground through the coral and, reaching sea level, floats on the salt water thus forming what is technically known as the Ghyben-Herzberg lens. All liquid in sufficient amounts or deposited over enough time drains into this fresh water lens. You know the result of no drinking water---death for life forms. It is absolutely critical that no waste liquids be poured onto coral; you must provide non-corrosive containers for liquids that, in an urban location, would be washed down drains. Urban conservators must check to see which waste chemicals local waste systems can tolerate.

CHAPTER 8 PAPER

This section will be useful in preserving you archival materials and current records.

WARNING

Technically speaking, bark cloth (tapa) and paper share certain characteristics, i.e., they are made from plant fiber bast hence cellulosic in structural make up. However, they are conserved very differently. Do not attempt any conservation measures on tapa before you consult PRCC BULLETIN NO. 7 THE CARE OF TAPA.

CHAPTER 9 WOOD

Guldbeck begins by taking the reader through the life processes of the living tree and on to the cutting of lumber. He discusses various approaches of woodworkers to a specific piece.

The author does not address South Pacific woods or objects, but the conservation problems and solutions described can be "translated" for island contexts.[1]

The treatment of waterlogged wood is a very particular science and not yet well documented in the literature. Saturated ground offers a safe, stable environment for organic materials especially. This is a great advantage to those involved in the recovery and preservation of these objects in a tropical climate.

The author discusses the archaeological "wet site", a term for a saturated area, a waterlogged site (this term applies whether or not the area is being excavated). Various techniques for the preservation of waterlogged wood are cited.[2] Guldbeck briefly described current methods of conservation, notably the PEG (polyethylene glycol) water replacement process.[3]

This is a new science, methods are not yet perfected and those now used, including PEG, require considerable expertise and sophisticated equipment in administeration. DO NOT TRY THIS ON YOUR OWN. Write Miss Antionette Han, Anthropology Department, Bishop Museum.

FOOTNOTES

1. Pacific woods fall into one of two categories, i.e., they are either "soft" or "hard". These botanical terms refer only to organic structure and are not descriptive of appearance, texture or weight. Island woods (50 samples) are currently being typed at the University of Washington.*

2. For information on waterlogged wood preservation write to the Bishop Museum's Anthropology Department where experiments in PEG conservation are currently conducted by Miss Han. Woods being treated are from the Vaito'otia wet site, Huahine, Society Islands, French Polynesia.

3. PEG is a waxy substance, takes a great deal of expertise, special equipment, time and money to administer properly. Most Pacific woods are of the "hard" variety; unfortunately this is the most difficult type to permeate.** PEG also changes the wood's color slightly and may result in a surface condition called "weeping" wherein waxy "crystals" form on the treated object's surface. Moreover, certain bacteria may have to be removed even before treatments begin. With all these drawbacks, the PEG treated artifacts I have examined in Hawai'i have none of the foregoing problems and are in excellent condition. These items include the Vaito'otia materials and wood and sennit from the Kualoa Archaeological Research Project collection.

* & ** Pers. comm. May 12 and 14, 1982, Miss Han.

CHAPTER 10 LEATHER

The term 'leather' refers only to properly treated skins and not used for untreated skins. The former are treated to make a substance which is durable and may be dyed, decorated, carved and made into book bindings, harnesses, trunks, clothing and so on. While Pacific skins may have been treated to promote durability, the usual conservation technology should not be used on them.[1]

This chapter does not apply to South Pacific reptile, ray, shark, fish, bird and human skins. However, the informtion that parchment should not be softened may be "translated" for the foregoing skins.[2]

FOOTNOTES

1. Unless the chemicals involved in early Pacific islanders' leather curing materials are known, the only conservation you had best practice is that of cleansing. Write PRCC about your project.

2. Among the foregoing skins is that of human beings. In Hawai'i, on the island of O'ahu, Dr. Kenneth Emory found a preserved female arm with tattooes and many Maori (New Zealand) tattooed heads may be found in the museums of quite a few countries. Should you have one and wish to clean it, write Mr. David Herod, Lowie Museum.

CHAPTERS 11, 12, 13 & 14 do not apply to objects found in South Pacific material culture. However, you can use information given in these chapters in regard to non-Pacific/ foreign-introduced materials and objects such as those used in the construction and finishing of museum buildings.

CHAPTER 15 TEXTILES

This chapter addresses the conservation of cotton, linen, and silk but much of the information can be "translated" for protein materials such as fur, feathers, and human hair.[1] The advice you need is given and please do not skip the section on fumigants and the dangers posed by their use. Guldbeck gives you the information you need in a clear, direct manner. For your own safety and that of fellow workers, follow his advice.[2]

FOOTNOTES

1. For information regarding the conservation of protein materials in particular see the UNESCO volume, Chapter 4, and PRCC BULLETINS NO.s 2,4 & 9. For information on natural fiber textiles, e.g., plaiting and weaving, see the UNESCO volume, Chapter 4 and PRCC BULLETINS NO. 1,2,4,8 & 9.

2. Should you decide not to purchase this work you must at least have the following material from Guldbeck:

1. Without adequate ventilation the build-up from fumes can kill you.
2. Do not use carbon tetrachloride based cleansers.
3. Do not smoke for a few hours after using solvents or you may become nauseated.
4. So not drink alcohol before using solvents. Alcohol in the bloodstream accelerates the toxic effects of some fumes.
5. If considering the use of cyanide gas---

FORGET IT!

Cyaniding must be done by professionals;
please do not attempt it---
---one whif can kill you.

CHAPTER 16 CERAMICS

Only the last section of this chapter applies to South Pacific pottery, also called "ceramics" and "coarseware" and is described as 'friable' (meaning crumbly).

FOOTNOTES

1. Island pottery is exposed to comparatively low degrees of heat being either sun-dried or baked in/over an open fire, hence the term "low-fired". Since South Pacific pottery is very friable most established techniques for cleaning ceramics should be avoided. Few of these pots and sherds will withstand washing with any sort of liquid. Probably the only trusted mode of cleaning is with a soft brush. While conservation methods include prolonged washing to leach accumulated salts from excavated pottery, it is NOT recommended you try this with friable coarseware. You may have to exercise "site science" on newly excavated pieces, i.e., apply a consolidant in situ almost immediately the pottery is uncovered. For examination or restoration of excavated ceramics, pots and sherds need to be supported in a box of clean sand. This container should be about three to three and a half inches high and about two feet or so square to accomodate average sized pieces. Large pots, such as made by the Aibom, Chambri Lakes district of the middle Sepik River in Papua New Guinea, will require a much bigger container. Fill it with enough sand to support pieces at any angle while you are working on them.

PLEASE NOTE WELL

Pottery is extraordinarily important to the anthropological study of cultural origins, island settlement, and trading in the South Pacific. To date archeologists have found comparatively little of this fragile material. Much of what has been recovered is little more than tiny bits. But even these small sherds provide what is called "hard evidence" and must be treated with respect. Should you be called upon to treat island pottery you must remember that it is too friable to withstand the usual techniques for conserving ceramics and that no liquid, not even water, should be used in any attempt to clean it. You will probably have to settle for soft brushing.

While much of this coarseware is plain, undecorated and unglazed it is nevertheless quite rare; its simplicity in no way detracts from its value.

Should pots or sherds be found by nonprofessionals in your area request they allow you to treat and store them. If the owners desire identification of the pieces they should send good color slides to the Anthropology or Ethnology Departments of Bishop Museum, the Art Department of University of Hawai'i or other nearby Museums and Universities with experts who are willing to be of help.

CHAPTER 17 GLASS

Volcanic glass (obsidian) is the only non-foreign introduced glass in the South Pacific. If you have glass artifacts such as scrapers and knives in your collection you will want to "translate" portions of this chapter.

If you have post-European contact trade beads such as the types found in many Melanesian articles or the large, multicolored beads found in Belau, Micronesia, you may find the conservation advice you need in this chapter.

CHAPTER 18 BONE, IVORY, & TEETH

To aid you in their identification, the composition of bone, ivory, and teeth is presented. The author advises contacting the nearest college zoology department for help with bone identification.[1]

Read the section on archaeological excavation. You may be called upon to make some quick conservation decisions if assisting in the field.[2] You can learn how to develop "first aid" for newly uncovered artifacts by becoming familiar with basic site science. Conservation in the field, in situ, is assuming more and more importance.

Excavated bone can be of enormous significance. Consolidation treatments for fragile bone can be administered before their removal from the material in which they were preserved. Much friable material cannot even be removed from the site until such treatment is completed.[3]

For further and more detailed information consult Chapter 17, UNESCO volume, and write PRCC.

FOOTNOTES

1. If no such institution is nearby, write the museum or university you think may be willing to help you. It would be wise to establish contacts with persons at Bishop Museum and the University of Hawai'i Anthropology Department before you have to ask for their help. (University of Hawai'i at Manoa, Honolulu, H.I. 96822)

2. Unfortunately, not all archaeologists have wet site and/or site science training. Conservation which takes place in the field is also called "in situ" conservation; this means literally "at the site". To say that some newly uncovered articles will "self-destruct" within minutes of contact with the air is NOT an exaggeration---I wish it were. You must avoid this sort of tragedy. Do not allow any excavation of wet sites or marine sites unless you are certain of the archaeologists' credentials and training.

3. Bone, like wood, should be immersed when it is removed from a wet site and held for conservation. All wet site materials, even plant pollens, yield information of the type destroyed at the surface under usual conditions. Archaeological dating techniques when used on the well-preserved wet site materials can tell us much of island prehistory such as the sequence of plant introduction, methods of food preparation and settlement patterns.*

* Pers. comm. July 1, 1982, Kenneth Emory

CHAPTER 19 STONE

For the most part Guldbeck addresses conditions pertaining to continental, sedimentary stones such as stones found on New Zealand and the islands of Melanesia. Those of you on atolls (coral) or "high" island (basalt) will not need to read this chapter.

APPENDIX I ADHESIVES

Answer Guldbeck's 12 questions included in this section befor you attempt to mend any object. This short, information-packed section cites various problems relating to damaged objects and to adhesives.

APPENDIX II ABRASIVES

In this section common abrasives papers are compared by size and number. Uses are listed for many kinds of abrasives such as sandpaper, pumice and steel wool. You may find these materials useful for your pre-restoration cleaning procedures on wooden objects, e.g., canoe paddles, kava bowls, spears and the like. You can benefit from this information since one can seriously damage artifacts with improper abrasives. Unfortunately, human beings can also be damaged; for example, slivers of steel wool can be inhaled and the finer grades are highly flammable. No need to learn the hard way, the author tells you how to avoid problems caused by these materials.

APPENDIX III BRUSHES AND PAINTS

This sections covers:

1 Brush selection
2 Dirty paint brushes
3 Painting tips
4 Removing old dried paint from wood or metal surfaces
    a Commercial paint removers
    b Home-brewed removers
    c Lye solutions

Some of these solutions can be harmful to artifacts and some can be harmful to you. Please read this section carefully. Accidents causing eye and nose irritation, loss of skin, blindness, and those causing fires CAN be prevented. While not all of the points mentioned in this Appendix will "translate" for the South Pacific context, it will be of use in the conservation of your museum structure and many of its furnishings.

UNESCO

The Conservation of Cultural Property

with special reference to tropical conditions

Place de Fontenoy, Paris -7e France 1968

Only the following chapters are annotated:

2. Climate and Microclimate
   Paul Coremans

3. Combating the Moulds [sic] Which Develop on Cultural Property in Tropical Climates
   Roger Heim, Francoise Flieder and Jacqueline Nicot

4. Identification and Control of Insect Pests
   J.J.H. Szent-Ivany

6. A. Basic Equipment and Processes
   H.W.M. Hodges

8. Pottery and Glass
   I. Gedye

19. C. Examples of Preservation of Monuments in India
   T.R. Gairola

14. The Conservation of Stone
   R.V. Sneyers and P.J. de Henau

18 Lighting, Air-Conditioning, Exhibition, Storage, Handling and Packing
   N.S. Brommelle

Chapter 2 Climate and Microclimate

Paul Coremans

Climate, Definition, Types and Distributions
Historical Distribution of Early Civilizations
Climate, Vegetation, Soil and Human Occupation
Climate, and the Deterioration of Cultural Property
- Combination of High Temperature and Abundant Moisture
- Combination of Low Temperature and Abundant Moisture
- Combination of High Temperature and Low Humidity
- Temperature As An Isolated Factor
  - Mean annual range
  - Annual range
  - Diurnal range
- Moisture As An Isolated Factor
  - Relative Humidity
  - Precipitation
  - Capillary action
- Atmospheric Pollution
  - Sulphation
  - Chloridation
- Erosion
- Tectonics

From Climate to Microclimate: Ancient Sites and Museums
- Climatic Subdivisions
- The City as Microclimate
- Historical Sites
- Indoor Storage
- Summary, Conclusion, and Appendix, "Causes of Damage to Museum Objects".

The author's discussion of climatic factors both geographically and microclimatically is excellent. He cites a well known cause of extreme internal stress for organic substances, i.e., the rapid absorption and release of moisture, a hazard due to rapid and severe temperature/RH changes. When such changes occur within a wide range during a 24 hour period (the diurnal range) they bring swift and certain degradation. Non-organic substances such as glass and stone suffer the same stress but to a lesser degree. Hostile microclimates within the museum are not uncommon so do not miss the section on "Indoor Storage", and continue to keep close surveillance of your humidity measuring devices.[1]

Coremans defines and discusses RH and notes its possible damaging effects on andesite stone. This information applies to islands with continental geology such as those of Melanesia. Also described is the process of efflourescence relative to coral.[2]

Do read the section under "Chloridation" and remember that the salt-laden Pacific air causes conditions which stress stone and other building materials. You need to practice conservation on the museum building itself and on its appointments and furnishings. Check the Appendix, "Causes of Damage to Museum Objects".

Coremans provides a short and illuminating chapter which is a primer on climate and microclimate. You will refer to this work quite often.

FOOTNOTES

1. Coremans's two horror stories, set in Persepolis and Tunisia, may seem unrelated to your problems since those two places have climates quite unlike that of the hot-humid tropics. But successful protection of cultural property often depends on the development of "conservation conciousness" not only in conservtors but in the general public and on governmental levels. The professional conservator needs a broad knowledge of conservation problems and solutions; this knowledge will give you the necessary perspectives regardless of your geographic location and climatic zone.

2. If your collection contains objects fashioned of coral, whether it be precious or reef coral, you will profit by conducting experiments on the various reactions to cleansing agents and other chemicals these objects are likely to encounter. Obviously, you must beware of compounds having the same or similar effects of efflourescence shown in this dramatic example.

Chapter 3 Combating the Moulds Which Develop on Cultural Property in Tropical Climates

Heim, Flieder and Nicot

The twenty drawings illustrating this chapter will help you to identify correctly various fungi which flourish in the tropics. Since cryptogamic growth is a major problem in hot-humid climates, you will refer to this chapter often.

Whether or not you are in a position to directly employ the advice in "Preventive Measures", do read it to increase you awareness of problem prevention. If you are planning a museum, you need this information in the early stages.

Data under "Remedial Measures" will give you ammunition for the ongoing battle against cryptogamic invaders.

Decontamination as soon as fungus is discovered is necessary. It is futile to remove and fumigate contaminated items only return them to a polluted microclimate.

Fungicides differ and so do dispersal methods. Simply releasing these compounds into the air without the proper spraying device may kill the mold, but added vapor also raises the RH. Guidance in spraying operations is offered. Also check with PRCC for information on newly developed or modified fungicides.[1]

Included in "The Key To The Principal Moulds, etc.", are the types of material they attack. Even nylon and plastic fall prey to cryptogamic growths.

You may find useful the discussion of micro-organisms attacking stone (does not apply to basalt) and timber, only one type of which mentioned here is specified as relative to the tropics.

FOOTNOTES

1. PRCC BULLETIN NO. 3 informs on chemicad toxicity and NO. 8 gives directions for making a thymol chamber. Remember the the literature published by manufactures is generally somewhat biased; get professional advice as well.

Chapter 4 Identification and Control of Insect Pests
J.J.H. Szent-Ivany

The author cites well-known, highly effective compounds but many of them should not be used by other than experts, licensed fumigators, or professional (the latter may include representatives of insecticide firms). This point is made very clearly and you must not overlook it.[1]

Appendix Formulae for book-eater repellents and drawings of 18 hungry bugs with photos of the types of damage they cause.

FOOTNOTES

1. This chapter is very useful to experts. Do not deceive yourselves that Sxent-Ivany is simply being overly cautious. He is not. In fact some to the compounds he mentions should not even be housed in your workshop or lab. Before you attempt any operations involving insecticides and/or fumigants PLEASE condult PRCC BULLETIN NO. 3.

Don't use:

carbon tetrachloride---fumes are deadly
paradichlorobenzene----cumulative liver poison
ethylene dichloride----dangerous fumes
cyanide gas----------lethal with one whif

All treatments need periodic follow-up examinations. Any new techniques found unsatifactory should be elimainated. In some cases what at first appears to be a better solution to problem A may increase or complicate problem B, or---what is worse---create a new one, problem C.*

* Pers. Comm. Louise Revol, June 1, 1979

Chapter 6 Equipping the Laboratory

A Basic Equipment and Processes

H.W.M.Hodges

Introduction

Containers

- Stock Solutions and Solvents
- Dry Sotck
- Working Containers
- Containers for Objects
- Labels

Measures: Weighing and Solutions

- Scales and Balances
- Volumetric Measures
- Making Solutions
  - From two or more fluids
  - From a fluid and a solid
  - Solutions strength

Water

- Tap Water
- Drainage
- Pure Water: Distilled and De-ionized

Washing

- Washing to Remove Dirt
- Prolonged Washing
- Intensive Hot Washing

Heaters
- External Heaters
- Internal Heaters
- Ovens
- Furnaces
- Blowers
- Infra-red Lamps

Heating
- Glassware
  - Chemical glassware
  - Domestic ovenware
  - Other glassware
- Flammable Materials
  - Solids
  - Liquids

Temperature Control

Drying
- Heating
- Alcohol Drying
- Drying Agents

Humidifiers

Fumigation

Vision
- Lighting
- Magnification

Safety Precautions
- Ventilation: Fume Cupboards
- Inflammable Solvents
- Gas Installation
- Poisons
- Fire-Fighting Equipment
- First Aid

Personal Equipment

Initial Examination

Basic Equipment

Seating and Benches

Administration

Records

Cleaning

The language in this chapter is easy to understand and conveys a great deal of useful information in a very clear way. Hodges considers the knowledge and skill of the lab technitians to be of more importance than sophisticated equipment. However, he mentions the possibility of securing assistance in equipping the lab. Monetary assistance may be accompanied by expertise in training your workers to use any equipment requiring special skill. There are also foundations and bi-lateral aid to assist Pacific museums in obtaining the necessary equipment.[1] You will probably need fewer types of equipment than the author covers.

Included in the cleaning methods are a number of approaches to washing, heating and drying. However, you must first be able to identify the principal impurities in your water supply.[2] There is a very good discussion on the advantages and disadvantages of using an electrically operated still for obtaining "soft" water, i.e., water with minerals removed.[3] To purify water you may decide to install deionizing equipment---but consider the points made by Hodges before you settle for this method.

You may be surprized to read that the author advises an abundance of natural light for the lab. However, he stipulates that it must be totally controlled.[4]

The advice under "Safety Precautions" will, if heeded, keep all of you in much better health---so pay close attention to it. Notice carefully the directions for preparing dilute acid solutions given under "Making Solutions" in order to protect yourself from acid burns. All museum personnel from the director down should memorize the six points for effective fire fighting and fire drills should be conducted.

FOOTNOTES

1. For information about which of these programs may be of help to you write PRCC for addresses.

2. Do not use "hard" or chlorinated water on any substances including stone and shell. Chlorine will evaporate given enough heat and time, but check with PRCC to learn if any undesirable effects remain.

3. Atolls will not have the same impurities in the water as will continental islands, but your water must be checked for purity no matter what the source of your supply.

4. Use of natural light within the museum is an issue which causes much discussion and controversy. If you use it you must make certain it is not direct; reflect all of it.

5. In the event of acid burns, consult PRCC BULLETIN NO. 3, section 3. You should have in the lab a well illustrated book on first aid placed where it is visible and easily reached. People who are called upon to administer aid in a crisis, and who may themselves be burned or otherwise injured, cannot be expected to distill information from a highly technical source. Make certain the first aid book is easy to read and has illustration which are not confusing. The print should be large and the pages should remain open by themselves, that is, the way a ringed binder stays open. Treatment procedures which must be carried out quickly should be printed clearly on large signs and attached to the wall near the sink where the first aid cabinet is located. Remedies and treatments should be checked from time to time on a regular basis so that out of date compounds may be replaced with fresh ones. No one should be expected to administer first aid simply by reading a book no matter how clearly written it is. Every person in a museum should have first aid training beginning with the director.

Chapter 8 Pottery and Glass

Ione Gedye

Volcanic glass (obsidian) was shaped and used as tools in some South Pacific societies. Other glass was brought in the form of trade beads and is quite common in Melanesia. Foreign beads have also been found in Belau, Micronesia. Unless you have specimens of the foregoing this chapter will be of no use to you except in the conservation of glass in the museum structure.

The type of pottery discussed is not the Pacific type.

Chapter 10 Monuments

C Examples of the Preservation of Monuments in India

T.R. Gairola

This work mentions limestone and basalt. Under "Causes of Decay" the author cites hot and humid climatic conditions along with organic growths (flora) and the absorption of sea salts (air borne) as well as leaching from rain water. You will be able to "translate" where necessary.[1]

The author includes photos of "before" and "after" regarding temple deterioration and subsequent conservation. In addition he shows a temple invaded by flora and the damage plants can cause if they are not eliminated.

FOOTNOTES

1. Remember that for 'limestone' you can read 'coral'; both are names for calcium carbonate. Marble is also a type of limestone.

Chapter 14 The Conservation of Stone

R.V. Sneyers and P,J, de Henau

If you have stone to preserve, whether portable artifacts or monuments, you will benefit from the information in this chapter.

The authors include photographs to illustrate a type of damage that can be sustained by precious coral. It consists of an encrustation, i.e., a hydrated efflorescence of calcium acetate. While you may not have any jewelry coral in your collection, you can still profit by studying this section. It clearly points out how easy it is to cause damage with agents generally regarded as safe.

As urban development increases you must guard against the resulting air pollution. If your museum is on an island you may have had to combat only salt and dirt in the way of air contaminants. However, if automobiles and diesel engines foul the air, if industrial wastes are discharged into the air and not blown immediately to sea, if you are located near traffic or an airport---take immediate steps to install air filters. You cannot allow this pollution to ruin your collection.

Cultural property made of stone and located out of doors, such as religious enclosures, habitation sites, and Yapese stone money may degrade rapidly if industrial contaminats are present. You will not be able to prevent all of this degradation but you can treat the stone for protection.

Chapter 18 Lighting, Air-Conditioning, Exhibition, Storage, Handling and Packing
N.S. Brommelle

Introduction

Light and Its Effects on Sensitive Cultural Property
- Pigments and Dyestuffs
  - Water-colours [sic]
  - Oil painting
  - Dyes in textiles
  - Woods
  - Natural history and ethnographical exhibits
  - Textile fibers
  - Paper and other cellulose material in sheet form
  - Paint media, varnishes and adhesives
  - Other organic materials

Methods of Reducing Light Damage

Adverse Atmospheric Conditions
- Atmospheric Contamination
- Material of organic origin
- Metals
- Siliceous and calcareous materials
- Control of Contamination
- Relative Humidity
  - Physico-chemical effects
  - Recommended levels of relative humidity
  - Effects of temperature

Air-Conditioning
- Refrigeration
- Filtration
- Design Elements
- Absence of Air-Conditioning

Packing for Transport
- Dangers Due to Variations in Humidity
- Packing Cases and Materials
- Precautions in Packing

Some of Brommelle's views are unconventional and do not parallel those of the other authors herein presented. For instance, he sees the primary function of the museum as exhibition and considers the storage of collections as secondary. He seems to be viewer-oriented in his opinion that museum atmosphere (temperature, RH) must be comfortable for the visiting public even though it is in conflict with optimal conditions for conservation.[1]

Brommelle agrees with other authors concerning climate; the principles of conservation are the same whether practiced in the tropics or in a temperate zone. The physical laws governing heat, light, humidity and air circulation remain fixed; they are not open to interpretation. An uncontrolled atmosphere ranging beyond safety limits results in degraded artifacts and harms the museum structure as well.

The author includes a list of light-sensitive materials and the section on "Methods of Reducing Light Damage" will be of great use regardless of your geographic location.

The author emphasizes the importance of good housekeeping routines. He describes two dangers (one certain, one possible) posed by dust deposits. It may surprize you that oxygen is a principal agent of decay.

Some of this material will "translate". Under "adverse Conditions" note the section on "Materials of organic origin"; you can read 'shark' (and other fish skins) for 'parchment'. And 'cellulosic fibers' include all plant materials such as hibiscus, flax, banana, pandanus, etc.

The information on temperature and RH is good and deserves to be studied carefully. But, note another instance wherein the author does not agree on a point made by some of the others; he refutes the chemical axiom rate per ten rises in temperature.

Included also are data pertaining directly to coral/limestone (calcium carbonate) and thus directly to the geology of Pacific atolls. Rain water is acidic and causes ongoing degradation of coral. The monuments and other architectural surface remains on many islands certainly need conservation against the continually damaging rain. Of course, polluted air must also be guarded against.

If your museum is located in the hot-humid tropics and lacks total air conditioning Brommelle's suggestions are particularly useful. Do not miss the section on "Refrigeration" or the discussion on "effective temperature". If you will have artifacts sent from the tropics you really must read "Packing for Transport"; this information is critical to the safety of shipped objects.

FOOTNOTES

1. Examine Brommelle's perspective and compare it to that of Guldbeck. The latter believes the protection of a collection to be a museum's most important function and that comfort of the viewing public must come second. You may not agree entirely with either expert but may find your own perspective lies somewhere between these two extremes and that it will be influenced by the opinions of other experts and insights gained through your own experience in the field. However, please consider the viewing public important enough to supply accurate exhibit labels for displayed objects. If you discover an inaccuracy, remove the label and substitute a simple, hand lettered apology and the information that a new label is on order. Use local printers as overseas firms can take quite a long time replacing labels.*

* Pers. Comm. David Kemble, Jan 10, 1983

CONCLUDING REMARKS

The most obvious conclusion to be drawn from this study is that a volume devoted to South Pacific conservation and museology is greatly needed. This work must go beyond the basics covered by the literature herein annotated and address island specific issues, e.g., salt laden air, hurricanes, museum scale and nonspecialist staff, archeological matters, transportation, appropriate technology for organic substances and limited budget, social values, and government goals concerning the educational role of museums.

There is opportunity for islanders to conduct research on the conservation of local substances and traditional material culture. For instance, might not composite objects with vegetable gums and resins be mended and restored using these same materials? When properly preserved their adhesiveness remains for hundreds of years. In addition, the delay and expense of importing foreign goods can be avoided as more problems are solved by local means. Findings might be written up and simply published (perhaps with a "Ditto copier) and shared for a small fee.

Many excellent artifacts are held in private collections: some are treasured family inheritance but the bulk was purchased. To prevent dispersal or loss of rare objects to the commercial market, museums might offer conservation information and/or courses for the public. The museum conservator has a difficult enough time---the private collector most often has not a lab at his or her disposal. It is important that dialogue between them and museums be established.

Testing and accrediting for appraisers of South Pacific arts must be established by an internationally recognized body or institution. This would protect islanders who sell artifacts, the buyers, and collectors who wish income tax deductions for donated articles. The U.S. Internal Revenue Service demands three appraisals of each item's market value. Unlike western fine arts however, much of the Pacific's rarest material culture (being deemed too precious) is never offered for sale. Without commercial value the item is seen by the IRS as virtually worthless. Obviously, a rare and commercially unavailable item is more, not less, valuable and donors must be given proper credit for putting such artifacts under museum protection. Criteria for evaluating Pacific arts must be based on type, condition, age, supply, materials and technology as well as the ritual, social, political and/or economic significance both traditional and current.

With minor exceptions, archaeological activity, site science and wet sites are all but overlooked in the literature. As this activity increases, island nations and museums are in need of information that will assist them in forming policy regarding visiting archaeological teams, local assistance, and recovery rights to artifacts. While conservation of waterlogged materials requires experts certain preparations must be taken before visiting teams arrive. Islanders need to know the enormous value of wet site material to the reconstruction of Pacific prehistory and settlement patterns and be prepared to offer protection before and during the working of such sites. There can be no pilfering; if saturated materials are allowed to dry they will be ruined.

Another area sorely ignored is that of color and design principles and exhibit aesthetics. Insensitive exhibits make a striking object look dull and rare objects look common. Certain colors are not enhancing to the subtle tones of natural fibers and woods nor are they appropriate to the shark's teeth weapons and deadly clubs. It is not enough to simply display objects, they must be presented in a manner be fitting their colors, shapes, uses and significance.

Finally the proposed work should include some show business information. Islanders regard their museums primarily as educational institutions; in this capacity they may be responsible for equipping mobile units for intra-island teaching aids and mounting traveling tours. These tours will include dance troups and will go abroad. Much guidance might be offered about organizing, mounting and maintaining such troups; it is a very complex business.

South Pacific nations are exploring the western concept of regionalism as a coping strategy in efforts to establish themselves within the world market economy. Just as the geographical designations of Polynesia, Micronesia and Melanesia did not exist prior to European contact, neither did the idea of regionalism. In their desire to become better acquainted and to introduce themselves to other nations, islanders and their museums deserve to be supported in the proposed work.

I have undoubtedly missed areas where further work is needed but I believe the foregoing are of particular use within the South Pacific context today and in the near future.

GLOSSARY

ABSOLUTE HUMIDITY/AH...The actual amount of water vapor in the air and measured per cubic meter.

AIR CONDITIONING...Properly used the term means filtered and cleansed air. As commonly used it refers to controlled air with regard to heat, humidity, and circulation.

ART APPRAISERS, CREDENTIALED/ACCREDITED...There is no U.S. institution or body accrediting appraisers of South Pacific art.

ARCHIVES...A depository for public records and documents.

ARTIFACTS...Any object or substance fashioned or modified by man. Nonportable artifacts such as walls and architectural foundations and structures may be termed 'monuments'.

ATOLL....A geologic term for a particular formation of low islands; a loosely circular coral reef with its islets surrounding a central lagoon, e.g., Kwajalein Atoll, The Marshall Islands, Micronesia.

ATMOSPHERE...See CLIMATE, this glossary.

AUTHENTICATION...A declaration of validity or genuiness based on evidence and made by an expert in the field.

BARK CLOTH...See TAPA, this glossary.

BIOCIDES...Chemical compounds which kill animals, insects, molds and bacteria.

BIODETERIORATION...Undesirable changes in substances and caused by live agents such as molds and insects.

CELLULOSIC...A botanical term. Used in conservation it refers to the structural make up of plants and their products such as leaves, bark and so on.

CERAMIC/POTTERY... Clay articles baked in either an open fire or an oven (kiln); they may also be sun-dried. Pacific pottery is not baked in kilns and is called "low fired"; it is very breakable.

CLIMATE..Meteorological phenomena, i.e., atmosphere; the combination of heat, humidity, light, and air circulation.

COMPOSITE OBJECTS...Artifacts made of more than one kind of substances such as those combining wood, paint, fur, shell inlay and vegetable gums.

CONDENSATION...(noun) Water droplets (moisture) on hard surfaces; the result of air-released vapor.

CONDENSATION...(verb) A process. When air cools and releases water vapor it forms on hard surfaces in droplets.

CONSOLIDATION...A conservation treatment designed to strenthen weak substances, e.g., bone and wood.

"CONTINENTAL ISLAND"...An island situated on a continental shelf and having sedimentary geologic formations such as granite, e.g., the Melanesian islands.

CRYPTOGAMIC GROWTH...Molds and fungus, algae and lichens.

CULTURAL PROPERTY...Material objects of a given people and having meaning within their society; this includes lore, ritual and performing arts.

CURATOR...A guardian or keeper, also a conservator, who is not acting in his or her own behalf.

DEGRADATION...A process of breaking down, a decay, decline or worsening; undesirable changes.

DEHUMIDIFIER...A device for removing water vapor from the air.

DIURNAL RANGE...The range of variations reached between two extremes within a 24 hour period (one day).

DOCUMENTATION...Recorded information, e.g., weights, measurements, drawings, photographs, and other pertinent data including personal testimony.

EMBRITTLED...Dry and fragile, e.g., extreme stiffness of natural fibers due to water loss.

FACSIMILE...An exact copy of the original.

FOXING...Stains from mold growth.

"FREE VENTIALTION"...Natural air conditioning from winds and breezes circulating through a structure.

FRIABLE...Very breakable and crumbly; Pacific pottery, that is, "coarseware", is friable in the extreme.

FUME HOOD...A device for accumulating and venting gasses.

FUMIGATION...A process; treatment using chemicals in gasseous form.

FUNGICIDES..Chemicals designed to kill fungi, molds and other life forms.

GHYBEN-HERZBERG LENS...The fresh, "sweet", water found underground in the coral islets of an atoll.

"GREENHOUSE EFFECT"...An architectural term describing a structural design which traps heat.

"HIGH ISLAND"...An island composed of basalt and formed by lava from continuing volcanic eruptions such as the Hawaiian Islands. Eventually these eruptions cease and winds and water erode the island.

HUMIDIFIER...A device for adding water vapor to the air.

HUMIDITY...Tiny droplets of water vapor (moisture) in the air.

HYGROMETER...A device for measuring the Relative Humidity.

INSECTICIDES...Chemical compounds which kill insects in one or another of their life stages.

IN SITU..."In/at the site"; an archaeological term.

LIGHT...Sunlight and daylight through the clouds, called "natural", and lamplight, called "artificial".

LUX.....A unit of measurement used to determine the quantity of light at a given place; the level of illumination.

MATERIAL CULTURE...Culture as expressed in media, i.e., the things of a given people. In a non-literate society, the oral history, language, ritual, songs, music and dance are material culture also.

MICROCLIMATE...Climates found within both the general geographical (outdoor) climate and the general and specific indoor climate including that within rooms, cases and drawers, etc.

MOLD/FUNGUS...Flora, plants, cryptogamic growths which reproduce by means of air bourne spores.

MONUMENTS...See ARTIFACTS, this glossary.

MUSEOLOGY...The formal study of museum principles, function, methods, goals, history and perspectives.

NONSPECIALIST...A person with little or no formal training and with no professional credentials.

ORGANIC...Pertaining to plants and animals; also used to identify type of materials in artifacts.

"PEG"/POLYETHYLENE GLYCOL...A synthetic compound used in the conservation of waterlogged wood and other organic materials. Treatments replace water by permeation.

PHOTOCHEMICAL REACTIONS...Undesirable changes at the surface of objects struck by light; decay caused by Ultraviolet rays.

PLAITING...See TEXTILES, this glossary.

PRESERVATION...In this paper 'preservation' means the same as 'conservation'.

PROTEIN MATERIAL...Protein is a chemical compound found in most animal and vegetable materials, e.g., fur, hair, skins, nails and claws, horn and sea turtle ("tortoise") shell, seeds and the like.

RARE...Few of a kind.

RELATIVE HUMIDITY... A ratio, a relationship, and not an actual amount. At any given temperature, RH is the ratio (expressed in percentages) between the actual amount (AH) of moisture and the amount necessary to saturate (100%RH) that air. RH is expressed in percentages.

RESOURCE PERSON...Any person with specialized knowledge; these people need not have credentials because they speak from personal experience.

RESTORATION...The process of restoration of appearance and/or strength of an object.

SATURATION...A degree of water vapor in a given amount of air; 100%RH: the level at which moisture cannot be further absorbed by the air.

SENNIT....Coconut fiber cordage.

SHEARDS/SHARDS...Pieces of broken pottery.

SILICA GEL...Crystals of moisture-absorbent material used as humidity control in closed areas.

SITE SCIENCE...Conservation treatments applied in situ; any method of conservation used in the field.

TEMPERATURE... Heat. The amount of heat in a given place and measured in degrees on two different scales, i.e., the Centigrade (°C) and the Fahrenheit (°F).

TEXTILES...A generic term for fabrics whether woven, plaited, loomed, or beaten (including tapa).

TRADITIONAL...Established, conventional, e.g., the customs, dress, beliefs and language of a given group of people; samness as handed down through successive generations.

"TRANSLATION"...The reading of one sort of information as if applied to an unaddressed substance or condition; the interpretation of potentially useful information not intended for the South Pacific or substances of its material culture.

ULTRAVIOLET/UV...Damaging rays found in all light in varying degrees and dangerous to organic substances.

UNIQUE....One of a kind.

WATERLOGGED...The condition or state of being saturated.

WEAVING...See TEXTILES, this glossary.

WET SITE...An archaeological term for a particular location or excavation with conditions described as waterlogged or saturated.

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