

Natural History Conservation

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Newsletter of the Natural History Collections Working Group of the
International Council of Museums - Conservation Committee.

EDITORIAL

Demand for the first issue has been brisk, with enquiries from all over the world - U.S.A. to China. Over 150 copies of the Newsletter (in English and French) have been sent out and requests still arrive frequently. This is indicative of a widespread dissatisfaction with the available knowledge in our subject area. Many of the approaches are for information - information that does not yet exist on a sound basis. However, the pace has quickened over the past year. An active group has been formed in North America, the Society for the Preservation of Natural History Collections, which is drawing people there together. The Geological Curators Group in the United Kingdom has been active in promoting conservation needs. These and other organisations are bringing people with ideas together. Although scanty information may have been the consequence of the small number of people working on the conservation of natural history collections, a major reason must be their isolation, frequently self-imposed. You, who read this, are self chosen proponents of natural history conservation. Please urge your colleagues to join us or a similar body.

We apologise for the late arrival of this issue. Pressure of work put delays in the way of its compilation. The delays do have advantages. Two aspects in particular have been improved. First, the questionnaire in the last issue has enabled us to prepare an improved list of active research projects. Secondly, a number of publications have been brought to our attention. These have been included in the list of publications which we hope will be a useful and expanding service that this group can offer to workers world wide in this field. Many of the references were kindly supplied by authors or editors.

Articles of use to natural history conservators are published in a wide variety of journals, proceedings and other compilations. Articles are sometimes reviewed and abstracts appear in Biological Abstracts, Chemical Abstracts or Art and Archaeology Technical Abstracts. The first two especially are expensive and only found in major

libraries. The last is widely available in the museum profession through membership of the International Institute of Conservation. None will cover the range of information of importance to the conservator. It is hoped that readers will contribute to these listings with references as they appear in the diverse literature. Full bibliographic information is essential, preferably with a short abstract.

As you can see, our offspring now has a name. It is descriptive, shorter than the full subtitle - and, we hope, unique. If the Newsletter is to remain healthy and active, the editors need to feed it with a varied diet. This can only be achieved with the help of the many people who are interested in this subject and who have the ingredients to hand.

C.V. Horie

F. Howie

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Send contributions, abstracts, letters etc. to the coordinators:

C.V. Horie,
Manchester Museum,
The University,
Manchester.
M13 9PL
U.K.

F.W. Howie
British Museum (NH),
Cromwell Road
London.
SW7 5BD
U.K.

THE MEMBERS

What they do, what they want.

C.V. Horie.

This is a brief analysis of the replies received in the questionnaire included with the first issue. We are grateful to all those who took the time to provide the information.

A total of 38 questionnaires were returned. This provides a small sample but significant because of the commitment to conservation of the respondents. Table 1 demonstrates various trends. Botany suffers from a lack of awareness of conservation problems. Both the earth sciences and zoology have a (short) recent history of increasing concern both of the problems and of attempts to tackle them. Considerable members have very wide responsibilities, in many cases having to deal with types of material other than natural history.

The replies indicate that there is more happening in natural history conservation than one might expect, although the efforts are largely small scale and isolated.

Research programmes, large and small, are summarised in Table 2 and mirror the numbers of workers in the various fields. The unsatisfied concerns of the respondents are summarised in Table 3. With luck, the results from current research projects will go some way to answer the most pressing needs of collections.

Table 1 Areas of responsibility of respondents

	Conservators	Collection Specialists	Total
Botany	0	2	2
Earth Sciences	5	6	11
Zoology	9	4	13
General	5	2	7
not Nat. Hist.	5	0	5
Total	24	14	38

Notes :

- 1) 'Conservators' describe those responsible for carrying out the physical care of the specimens including collection managers.
- 2) 'Collection Specialists' describe those whose primary task is the study and taxonomic ordering of the specimens.

Table 2 Research in progress.

Topic	Research Contact
<u>General</u>	
Pest control/fumigants	Caffey-Moquin, Druzik, Savill, Williams.
Storage/environment	Caffey-Moquin, Harvey.
Preservation of documentation	Code, Massaro
Preservation of biomaterials	Romero-Sierra
Identification of deposits on specimens	Hawks.
<u>Botany</u>	
none	
<u>Earth Sciences</u>	
Shale deterioration	Collins
Excavation/preparation in palaeontology	Johnson
Fossilisation process, natural/artificial	Bang
Preservation of organic components in fossils	Bang
Casting Materials	Golden
Treating deteriorated sub-fossil lone	Monaghan
Pyrite conservation	Waller, Thamdrup.
<u>Zoology</u>	
Shell efflorescence	Hendry
Fading of feathers by light	Horie
Skeletal preparation/preservation	Code, Hawks
Long term changes in preserved mammals	Massaro, Uribe, Williams
History of skin preservation treatments	Hawks
Effect of different skin preservation treatments	Horie
Liquid preservatives	Cato, Jones.

Research Contacts.

B.S. Bang, Geological Museum, University of Copenhagen, Oster Voldgade 5-7, dk-1350, Copenhagen K, Denmark.

Ms. M. Caffey-Moquin, New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque, New Mexico 87194-7010, U.S.A.

P.S. Cato Esq., Dept. of Wildlife & Fisheries Sciences, Texas A & M University, College Station, TX 77843, U.S.A.

Laurel Code, Mammal Department, MCZ, Harvard University, 26 Oxford Street, Cambridge MA 02138, U.S.A.

C.J. Collins Esq., Asst. Keeper Earth Sciences Conservation, 96 New Walk, Leicester. LE1 6TD

J. Druzik, Extra-Mural Research, Getty Conservation Institute, 4503 Glencoe Avenue, Marina del Rey, California 90292, U.S.A.

Ms. J. Golden, Museum of Natural History, University of Iowa, Iowa City, Iowa 52242, U.S.A.

R.S. Harvey Esq., Milwaukee Public Museum, 800 West Wells Street, Milwaukee, Wisconsin 53233m U.S.A.

Ms. C.A. Hawks, Smithsonian Institution, Division of Mammals NHB 390, Washington DC 20560, U.S.A.

R. Hendry Esq., Glasgow Museum & Art Gallery, Kelvingrove, Glasgow. G3 8AG

C.V. Horie Esq., Keeper of Conservation, The Manchester Museum, The University, Manchester. M13 9PL. U.K.

R.E. Johnson Esq., Dept. of Geology, Milwaukee Public Museum, 800 W. Wells, Milwaukee, Wisconsin 53233, U.S.A.

Ms. E. M. Jones, Dept. of Mammals, Transvaal Museum, P.O. Box 413, Pretoria 001, R.S.A.

Ms. M.R. Massaro, Mammal Dept., Museum of Copenhagen Zoology, Harvard University, Cambridge MA 02138, U.S.A.

Mr. N.T. Monaghan, Geological Section, National Museum of Ireland, 7-9 Merrion Row, Dublin 2, Ireland.

Dr. C. Romero-Sierra, Dept. of Anatomy, Botterall Hall, Room 926, Queen's University, Kingston, Ontario, Canada. K7L 3N6.

A. Savill Esq., Canterbury Museum, Rolleston Avenue, Christchurch 1, New Zealand.

C. Thandrup Esq., Midtsnderiyllands Museum, Fabriksvei 17, DK 6510 Gram, Denmark.

F. Uribe, Museu de Zoologia de Barcelona, Ap. Correus 593, 08003 Barcelona, Spain.

S.L. Williams, The Carnegie Museum of Natural History, 5800 Baum Boulevard, Pittsburgh PA 15206, U.S.A.

Table 3 Techniques which require investigation and improvements in rough order of demand.

Pest control - fumigation

Liquids for preservation

Storage and environmental specification.

Restoration of skins.

Skin preparation.

Consolidants, adhesives and coatings.

Skeletal preparation.

Shale/clay conservation.

Pyrite conservation.

Freeze drying.

Reducing fragility of herbarium specimens.

Education about conservation.

Cleaning of fur/feather.

Preservation of volatile mineral specimens.

Labelling.

Words are fickle. The meaning of a word can change with the person using it and with the circumstances. 'Dirty' to a proud housewife means something different to a child making mud pies. Most communication uses words and their variability adds interest and insights for another person. However when precision is required, the variability becomes inconvenient or even dangerous. For unambiguous communication, the terms ('symbols') used must be vigorously defined. Terminology control is frequently one of the first tasks in cataloguing/describing a collection. Words in common currency are chosen and their use restricted. The use of familiar words allows non-specialists to understand and work within the system.

Unfortunately most specialisms rapidly discover that words available in spoken languages are inadequate to describe the number of objects and differences between them. This gives rise to artificial terms, frequently derived from the dead language, Latin. Examples include the binomial nomenclature of species and medical descriptions of anatomical parts and conditions. Numerical designations are used where a property can be ordered or quantified. This has been found particularly useful in defining differences or in changes in a specimen. Examples include assessing the effect of light on blue wool fading standards using a grey scale [1] and assessing the deterioration of paint films [2].

Reporting method.

As part of the renewal of the mammal gallery at The Manchester Museum, the condition of specimens had to be assessed. Full scale condition reports are frequently desirable, and their use has been developed particularly in the field of fine art [3] where the similarity of objects in construction lends itself to a uniform approach to reporting. The first stage is to distinguish the components making up the object, therefore permitting each to be considered separately. For a mounted animal these components are: the mounting system, the skin, and the fur (or feathers). An additional component may be the decorated surroundings for the animal. Ideally, each component should be described using photographs and drawings with annotations of visible deterioration, supplemented by analytical results (4).

For the survey at the Museum a more summary reporting method was sufficient. In describing the condition of the specimens, it was found that similar terms were used repeatedly. This led to the idea of a standard method for describing the condition. The crucial changes that occur in specimens are, first, those that result in permanent damage to the scientific and/or aesthetic value of the specimen and, second, those that result in partial (or total) destruction. The

first may be ameliorated by conservation treatment, the second may require wholesale restoration. As these changes occur gradually and unevenly across a specimen, a graduated scale of condition was developed, from 5 ('as new') to 0 (catastrophic). These gradings, listed and defined in tables 1 to 3, are summaries of the condition based on a visual inspection. They can be amplified using a descriptive word or combined. For example, F3 (fading), would be used for the fur of a specimen that is slightly faded.

These descriptions are designed to summarise condition/deterioration and do not assess the acceptability of that condition nor the merits of carrying out conservation/restoration work. These points are only partly the concern of conservation and must be discussed along with other factors such as the availability of comparable specimens and of resources.

Although not attempted so far, it is anticipated that these codings will help in studying the state of preservation of categories of specimens, divided up by, for example, genus, date of preparation, or taxidermist.

References

1. ISO 105-1978, Textiles - Tests for colour fastness.
2. ISO 4 628 - 1982, Paints and varnishes - Evaluation of degradation of paint coatings. Designation of intensity, quantity and size of common types of defect.
3. Stolow N. Conservation and Exhibitions, Butterworths (1987) pp. 25 - 46.
4. See abstract 2:130 (this issue)

Table 1 - Mounting System.

Codes for describing condition.

- M5: As prepared condition, no deterioration apparent.
- M4: External to specimen, can be restored.
- M3: Internal support failing, allowing specimen to distort.
- M2: Gross breakage of internal mount, loss of internal wadding.
- M1: Skin parted from mount.
- M0: Mount disintegrated or lost.

Table 2 - Skin

Codes for describing condition.

- S5: As prepared condition, no deterioration apparent.
- S4: Slight soiling; specimen readily taken back to S5.
- S3: Slight distortion or staining, specimen permanently damaged.
- S2: Considerable distortion, slight splitting or slight separation of epidermis; specimen can be improved by restoration.
- S1: Gross tearing, gross loss of epidermis; specimen easily damaged by handling.
- S0: Considerable loss of skin.

Society for the Preservation of Natural History Collections. There are signs in N. America that the curation of natural history collections is increasingly recognised as being worthy of detailed attention and improvement. Similar evidence as been seen in recent years in the United Kingdom e.g. [2], [3]. The publication covers treatment of specimens, their documentation and storage. Some useful philosophical discussions on conservation and curation are included in two introductory papers by Horie and McAlpine and two papers on collection management at the end by Simmonds and McAlpine.

The distinction between 'preparation' and 'preservation' is frequently undefined for natural history specimens, probably because both processes are undertaken, simultaneously, by the same person. Inherently unstable specimens have often been prepared for study or display with little consideration for long term stability. It was therefore useful that the 5 papers on preservation techniques included an indication of the expected life of the treatment. The papers dealt with staining small vertebrates, preparing frog skeletons, and methods for preserving the colour and form of both flowers and green parts of plants. Of the 6 papers presented on treatments for preservation, only one is printed in full - a description of dealing with pyrite disease. The rest are recorded as abstracts, usually containing little information. While extracting manuscripts from authors can prove difficult, if not impossible, the inclusion of abstracts in a volume such as this may encourage laziness in future would-be authors.

The 5 papers on documentation show the persuasive effect of the computer with its potential power to save time and to cross reference collections. By giving the historical background, all demonstrate that real improvements have been made. They provide benchmarks against which ones' own efforts can be judged. Three main points emerge. The data required for each specimen must be defined then made available. This data must be input in a form compatible with the computer. Finally, with sufficient time and resources, as system can be made to work. One author remarks that the life of a computer system (with its software) is about 5 years. The centralised system of PARIS may now be a obsolete, with the increased power of distributed systems. The most valuable results of the world-wide effort into computerisation will probably be the improvement in collection management - and the finding of missing specimens.

The three papers on storage methods demonstrate the wide range of techniques necessary for delicate natural history specimens from an augmented filing card system for small fossils to roller rack systems.

Currah and Sigler's paper on curating viable botanical specimens reinforces the need for museum techniques of preservation that cause as little denaturation as possible.

Table 3 - Fur/Feather

Codes for describing condition.

- F5: As prepared condition; no deterioration apparent.
- F4: Slight soiling or displacement; specimen readily taken back to F5.
- F3: Slight fading, loss of texture, severe soiling; specimen permanently damaged.
- F2: Severe fading, weakening of fibres, slight insect damage (<5% loss); specimen can be treated only with difficulty.
- F1: Fibres extremely fragile; specimen cannot be moved without damage.
- F0: Considerable loss of fur/feather from skin.

REVIEW

Proceedings of the 1985 Workshop on the Care and Maintenance of Natural History Collections, ed. J. Waddington and D.M. Rudkin, Royal Ontario Museum (1986). Available from Publication Services, ROM, 100 Queens Park, Toronto, Canada. M5S 2C6. \$7.50, 121 pp., 24 papers and 8 abstracts.

Review by C.V. Horie with comments by C.W. Pettitt (both of The Manchester Museum). The titles of the papers are included in the abstract section of this issue.

This publication is a welcome successor to the proceedings of the 1981 Workshop [1]. Out of these meetings has grown the active

Museum specimens will be a valuable source of biochemical information even if they cannot be regrown.

Museum workers will be grateful to Waller and McAllister for developing a test for formaldehyde in wet preserved collections. McKillop's paper on fading of entomological specimens would have been more useful if he had used visible light instead of ultra-violet radiation whose effects are not directly comparable with that of light. Hawks and Williams provide a scheme for the care of labels in collections, frequently the more important component of the specimens. The volume finishes with two short bibliographies on clearing and staining vertebrates and on health and safety.

The quality of many of the papers demonstrates the improvements that can be made in the care of natural history specimens. However there is no coherent theme. The breadth of topics covered in the Workshop reveals that there are still few specialists to create the stimulating interaction necessary for full development of the subject.

- [1] Proceedings of the 1981 Workshop on Care and Maintenance of Natural History Collections, ed. O.J. Faber, Syllogeus Series 44. National Museums of Canada (1983).
- [2] see abstract 2:107 in this issue.
- [3] see abstract 2:9 in this issue.

MEETINGS

Society for the Preservation of Natural History Collections.
Annual Meeting 1987 held at Redpath Museum, Montreal, Canada.

May 31 - June 3. Reviewed in next issue.

Annual Meeting 1988 at The Carnegie Museum of Natural History, 5800 Baum Boulevard, Pittsburgh, Pennsylvania 15213, U.S.A.

May 31 - June 3, 1988. Contact Dr. D. Schlitter, Section of Mammals, The Carnegie Museum of Natural History.

ICOM-Conservation Committee, 8th Triennial Meeting, Sydney, Australia. 6 - 11 September 1987. Preprints of papers will be available from ICOM in Paris (see under groups for address).

1987 Geotechnology symposium and exhibition, London, 8-10 September 1987. Contact Mr. B. Foster, Royal School of Mines, Imperial College, London. SW7 U.K.

GROUPS

Groups with an interest in natural history specimen conservation.

International Council for Museums (ICOM), based at Maison de l'UNESCO, 1 rue Miollis, 75732 Paris Cedex 15, France. The international body for museum matters. Publishes ICOM News quarterly and members receive Museum (published by UNESCO) quarterly. Organises a triennial meeting. It is made up of committees. National Committees organise subscriptions and national events. International Committees (22) consist of subject specialists and hold specialist meetings etc. (see below).

ICOM-Conservation Committee, Secretary (S. Inman), ICCROM, Via di San Michele 13, 00153 Rome, Italy.

ICOM-CC publishes a yearly Bulletin. Organises a triennial meeting whose papers are published. It is made up of 26 working groups on various subjects, e.g. ethnographic materials, stone, lighting and climate control, leather, control of biodeterioration. Some of these produce their own newsletters.

ICOM - Natural History Museums Committee, Secretary (R. Jullien), Office de Cooperation et d'Information Museographiques, 17 rue Abbe de l'Eppe, 34000 Montpellier, France. Publishes Newsletter and organises annual conference.

International Institute for Conservation, 6 Buckingham Street, London. WC2N 6BA, U.K. IIC publishes a journal Studies in Conservation quarterly and a Bulletin six times a year. Members also receive Art and Archaeology Technical Abstracts biannually. Holds biennial meetings whose papers are published.

United Kingdom Institute for Conservation, 37 Upper Addison Gardens, Holland Park, London W14 8AJ, U.K. UKIC publishes a journal The Conservator annually and Conservation News three times a year. Organises specialist meetings.

Norske Naturalhistoriske Museums Landsforbund (Norwegian Museums of Natural History), President (B. Shei) NNML, c/o Tromso Museum, Tromso N-9000, Norway. Produces newsletter and meets annually.

Natural History Affinity Group of the Mountain - Plains Museum Association, contact P.S. Cato, Texas A.M. University, College Station, TX 77843, U.S.A. Meets annually.

Continued on Page 12.

ABSTRACTS

Publications of relevance to natural history specimen conservation. Divided into the following sections: General, Environment and Storage, Methods and Materials, Botany, Earth Sciences, Zoology.

GENERAL

- 2:1 Proceedings of the 1985 Workshop on Care and Maintenance of Natural History Collections, ed. J. Waddington & D.M. Rudkin, Royal Ontario Museum (1986).
- 2:2 Conserving natural history collections: some present problems and strategies for the future. F.M.P. Howie. in abstract 2:1, 1 - 6.
[Statistics describing the scale of the task and methods for tackling it]
- 2:3 Curators and natural history collections: have we become islands in science? F. McAlpine.
in abstract 2:1, 7 - 13.
- 2:4 The Russell Effect - a review of its possible uses in conservation and scientific examination of metals. V. Daniels. Studies in Conservation 29 (1984) 57 - 62.
[A test for oxidation, e.g. autooxidation of organic materials, using the effect of peroxides on photographic film]
- 2:5 Conservation of leather, H.A.B. Van Soest, T. Stamboloo & P.B. Hallebeek, Studies in Conservation 29 (1984) 21 - 31.
[Interesting for the tests carried out as a preliminary to conservation].
- 2:6 The Organic Chemistry of Museum Objects, J.J. Mills & R. White, Butterworths (1987).
[An account, principally of plant resins, but also including the other constituents of botany and zoology collections].
- 2:7 A preliminary list of Conservation Resources for the Care of Natural History Collections, C. Hawks; Society for the Preservation of Natural History Collections (1987), available from the SPNHC Conservation Committee, c/o C. Hawks, U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.
- 2:8 Ideas on how to better preserve collection of natural history, M.L. Florian. Collection Forum 2 no 2 (1986) 6-7.
- 2:9 Biological Collections U.K., ed. F.W. Dunning. Museums Association (1987).
[A survey of 230 institutions covering collections, their curation and, use, with recommendations.]
- 2:10 Memorandum to Plastazote users, G.C. McGavin. Biological Curators Group Newsletter 4 (3) (1985) 67-68.
[The open pore structure of this foam causes damage to specimens, smooth surface materials are recommended].
- 2:11 Wood coatings for display and storage cases, C.E. Miles. Studies in Conservation, 31 (1986) 114 - 124
[A study of barriers useful for preventing volatiles escaping from wood and affecting objects].
- 2:12 The distribution of gaseous air pollution within museums, S. Hackney, Studies in Conservation 29 (1984) 105 - 116.
[review of the nature, ingress and removal of air pollutants].
- 2:13 Conservation and Exhibitions, N. Stoler, Butterworths (1987).
[A guide to the requirements and measures to be taken for the exhibition and transportation of objects].
- 2:14 Checklist for the establishment of a microclimate, M. Casson. The Conservator 8 (1985) 14 - 16.
[Guidelines for preparing special conditions for an object].
- 2:15 Lighting in Museums, Galleries and Historic Houses (Pre-prints) (1987) Museums Association, 34 Bloomsbury Way, London. WCLA 2SF
[A meeting covering the science, aesthetics and practice of using light in museums].
- 2:16 Damage to museum objects by visible radiation (light) and ultraviolet radiation (uv), S. Michalski, in abstract 2:15
- 2:17 Evaluating colour change : intention, interpretation and lighting, C. Villers and G. Hedley. in abstract 2:15
- 2:18 Problems with ultraviolet filters S. Staniforth. in abstract 2:15
- 2:19 Light dosimeters for museums, galleries and historic houses, N. Tennent and J. Townsend. in abstract 2:15
- 2:20 Preferred lighting for the display of paintings with conservation in mind, D. Loe. in abstract 2:15
- 2:21 Visual acuity, colour discrimination and light level, P. Boyce. in abstract 2:15.
- 2:22 Lighting Options - daylight and artificial lighting, M. Wilkinson. in abstract 2:15.
- 2:23 Low voltage lighting, J. Wadsworth. in abstract 2:15.
- 2:24 Experiments with fluorescent lamps: theory and reality, D. Saunders. in abstract 2:15.

ENVIRONMENT/STORAGE

2:25 Casting new light on Turner: strategy and practice for the lighting of the Clore Gallery, P. Wilson. in abstract 2:15.

2:26 The Hampton Site extension: lighting considerations, M. Wilson. in abstract 2:15.

2:27 Lighting in historic houses, J. Bell. in abstract 2:15.

2:28 The United States: three daylighting projects, P. Marantz and J. Fisher. in abstract 2:15.

2:29 Some lessons from three museums, W. Allen-Bickerdike. in abstract 2:15.

2:30 The British Museum: lighting a three dimensional object, S. Muirhead and G. Pickup. in abstract 2:15.

2:31 Display case lighting: two simple solutions, S. Michalski. in abstract 2:15.

2:32 Fibre optic lighting in museums, galleries and historic houses, R. Owen. in abstract 2:15.

2:33 Lighting the new Egyptian Galleries at the Manchester Museum, C.V. Horie and A. Millward. in abstract 2:15.

2:40 Design considerations for compact storage. G.M. Pratt. in abstract 2:1, 89 - 91.

2:41 Care of specimen labels in vertebrate research collections. C. Hawks and L. Williams. in abstract 2:1, 105 - 108. [Encapsulation of labels in polyester film, after conservation].

2:42 Inks for Documentation in Vertebrae Research Collections, S.L. Williams & C.A. Hawks, Curator 29 (1986) 93 - 108.

MATERIALS AND METHODS

2:45 Materials for Conservation, C.V. Horie, Butterworths (1987)
[A review of Organic consolidants, adhesives and coatings used in conservation, their properties, uses and pitfalls]

2:46 The freezing process - effects on insects and artefact materials, M.C.E. Florian, Leather Conservation News. 1 - 13 and 17.
[Report of investigations and use of low temperatures (e.g. -20C for 48 hrs.) for killing insects].

2:47 Pesticides in museums. J. Lee, Biological Curators Group Newsletter 3 (10) (1984) 556 - 564.
[Contains U.K. addendum to 'Pest Control in Museums: a Status Report']

2:48 A spot test for distinguishing formalin from alcohol solutions. R. Waller and D.E. McAllister. in abstract 2:1, 93 - 99.

[Description of the calibration, preparation and use of a test paper]

2:49 Health and safety in natural history museums: an annotated reading list. J. Waddington and J. Fenn. in abstract 2:1, 117 - 121.

2:50 Review of 'Biological Museum Methods' (Hangay and Dingley), R. Harris, Biological Curators Group Newsletter 4 (6) (1986) 127 - 128.
[Useful especially for the additions to the book]

2:51 A clean and safe gravimetric method to differentiate spirit, formalin and other fluid preserving media, S. Moore. Biological Curators Group Newsletter 4 (5) (1986) 113
[A do it yourself tool using a calibrated float]

2:52 Sealing of museum jars with silicone mastic, C.V. Horie Biological Curators Group Newsletter 4 (5) (1986) 114 reprinted from Conservation News no. 20 (1983).
[A silicone sealant used with a primer, successfully sealed glass jars of 3 preservatives but not formalin].

2:53 Insecticide analysis by gas chromatography in the stores of the Danish National Museum's ethnography collection, J. Glastrup, Studies in Conservation 32 (1987) 59 - 64.
[Naphthalene, DDT, methoxychlor found in the air of stores and cases].

2:54 The use of Paraloid B-72 as an adhesive : its application for archaeological ceramics and other materials. S.P. Koo, Studies in Conservation 31 (1986) 7 - 14.
[B-72 has been shown to be a stable polymer. A formulation for workable adhesive is described].

2:55 The yellowing of epoxy resin adhesives : report on natural dark ageing. Dr. J.L. Down, Studies in Conservation 29 (1984) 63 - 76
[A useful survey of commercial epoxy adhesives. Startling results showing the rapid deterioration].

2:56 Polymer dispersions artificially aged. R. Howells & A. Burnstock. The Conservator 9 (1985) 46 - 48.
[Acrylic and vinyl acetate dispersions ("emulsions") and their changes in properties on ageing].

2:57 Adhesives and Consolidants, ed. N.S. Brommelle, E.M. Pye, P. Smith, G. Thomson, International Institute for Conservation (1984).

2:58 Adhesion and adhesives - some fundamentals, K.W. Allen. in abstract 2:57

- 2:59 Adhesive testing at the Canadian Conservation Institute, past and future. J.L. Down. in abstract 2:57
- 2:60 Strength testing of adhesives and consolidants for conservation purposes, S. Bradley. in abstract 2:57.
- 2:61 Risk assessment as applied to the setting of solvent toxicity limits, N.S. Baer. in abstract 2:57.
- 2:62 Influence of the modification of dispersions on film properties, E. de Witte, S. Florquin and M. Goessens-Landrie. in abstract 2:57.
- 2:63 Polymer dispersions artificially aged, R. Howells, A. Burnstock, G. Hedley and S. Hackney. in abstract 2:57.
- 2:64 The conservation of leather bookbindings, B. M. Haines. in abstract 2:57.
- 2:65 Methylcellulose and sodium carboxymethylcellulose: an evaluation for use in paper conservation through accelerated ageing, C.A. Baker. in abstract 2:57.
- 2:66 Graft copolymerization as a method of preserving papers : problems and potentialities, M.L. Burstall, C.C. Mollett and C.E. Butler. in abstract 2:57.
- 2:67 Adhesives for the consolidation of textiles. J. Verdu, V. Bellenger and M.O. Kleitz. in abstract 2:57.
- 2:68 Influence of adhesives on the conservation of textiles, L. Masschelein-Kleiner and F. Bergiers. in abstract 2:57.
- 2:69 An old adhesive - starch paste. A new technique - the suction table offers new horizons in the treatment of brittle textiles, F. G. Thomsen. in abstract 2:57.
- 2:70 Adhesive formulations manipulated by the addition of fumed colloidal silica, G. S. Byrne. in abstract 2:57.
- 2:71 Infrared studies of the kinetics of insolubilization of soluble nylon, F. Bockhoff, K-M. Guo, G.E. Richards and E. Bockhoff. in abstract 2:57.
- 2:72 The use of silicones in the preservation of a field site - the Lark Quarry dinosaur trackways, N. Agnew. in abstract 2:57.
- 2:73 Materials used for preserving fossil specimens since 1930: a review. F.M.P. Howie. in abstract 2:57.
- 2:74 The consolidation of archaeological bone, S.P. Koob. in abstract 2:57.
- 2:75 The continued use of shellac as an adhesive - why? S.P. Koob. in abstract 2:57.
- 2:76 The performance of coatings and consolidants used for archaeological iron, S. Keene. in abstract 2:57.
- 2:77 The removal of microcrystalline wax from archaeological ironwork, R. Johnson. in abstract 2:57.
- 2:78 Injection grouting of mural paintings and mosaics, D. Ferragni, M. Forti, J. Malliet, P. Mora, J.M. Teutonico and G. Torraca. in abstract 2:57.
- 2:79 Some practical aspects in the choice of synthetic resins for the repair of ethnographic skin and gut, J. Fenn. in abstract 2:57.
- 2:80 The examination and treatment of ivory and related materials, C.E. Snow and T.D. Weisser. in abstract 2:57.
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