

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

## EDITORIAL

### Help!

We are grateful for the contributions from many sources that go to make up this issue. The world is beginning to work at conservation activity on the natural history collections. If you are engaged in a project, let the rest of the world know by sending a statement for publication here. Reviews, abstracts and announcements welcome. This newsletter is in considerable demand, with about 200 subscribers, and is widely read.

Start writing now. Papers on the conservation of natural history collections will be required for the Triennial Meeting of ICOM-CC in August 1990. The deadline for papers is usually about 9 months before this, i.e. January 1990. Time soon passes.

Following a decision of the ICOM-CC Directory Board, newsletters issued by Working Groups are being given financial support from central ICOM funds. We are pleased to acknowledge the help of Janet Bridgland and Cliff McCawley (Chairman and Treasurer of ICOM-CC) in providing a contribution to the work of the Working Group. I realise, from experience, the cost and inconvenience of international transactions. This should not be necessary in future for members of the Working Group. Natural History Conservation is financially secure.

C.V.Horie

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Send contributions, announcements, abstracts, letters etc. to the coordinator:

C.V.Horie, Tel. 44(61)275-2656  
The Manchester Museum, Fax. 44(61)275-2300  
The University,  
Manchester,  
M13 9PL  
UK

To save typing, use the computer networks:-  
JANET: MZFAVH@UK.AC.UMRCC.CMS  
BITNET or EARN: MZFAVH@CMS.UMRCC.AC.UK@UKACRL  
INTERNET:  
MZFAVH@CMS.UMRCC.AC.UK@CUNYVM.CUNY.EDU

## COORDINATOR'S REPORT

The first issue of our Newsletter (April 1986) included the Working Group programme for 1984-1987. In retrospect it seems a bit ambitious. Many of the pressing needs for conservation, research, publication and inter-laboratory evaluation can be addressed by the Working Group only when the number of active research centres increases significantly.

The major achievement of the Working Group is this Newsletter which, by its existence and penetration into libraries and conservation workshops, reinforces the realisation that natural history collections need conservation if they are to survive. The first issue took a first step towards a survey of conservation facilities and personnel. (Those of you who have not yet filled out the form, please do so.)

The Working Group meeting in Sydney was attended by about 25 people. Unfortunately, Rob Waller who contributed a paper to the preprints on "An experimental ammonia gas treatment method for oxidised pyritic mineral specimens" was unable to attend and deliver his paper. After a brief introduction future directions for the Working Group were discussed. Each Working Group produces an outline for its work at each ICOM-CC Meeting which is assessed and revised and the following one. The programme for the 1987-1990 Triennial was developed:

### PROGRAMME 1987 - 1990

- 1. Propaganda:** To persuade those working in our field but with different backgrounds, e.g. collection specialists, preparators, pathologists, of the need for the defined activity of 'Natural History Collection Conservation', and for the need of cooperation.
- 2. Environmental Standards:** To conduct a survey of the provision of environmental control and physical arrangements in collections and to develop standards for those.
- 3. Newsletter:** To place on a firmer footing - Natural History Conservation and to expand the liaison and abstracting components.
- 4. Support:** By bringing workers into contact, to provide mutual support and dialogue for isolated efforts, and to encourage publication of the work.
- 5. Ethics:** To initiate discussion on the limits and type of intervention on natural history specimens.

The achievements of the Working Group are dependent on the energy and input of its members. Contributions towards this programme and the wider aims of the group are required. Offers of assistance from members would be most welcome.

Finally, Frank Howie and I have exchanged places; he becoming Assistant Coordinator and I Coordinator. Frank played the primary role in putting the Working Group on its feet and gaining support from other sources. He is now (perhaps temporarily) working largely in the museum safety and management field but retains outside activities in conservation. We would welcome suggestions of anyone who might wish to join the coordination team. Elections are held at the next Triennial Meeting of ICOM-CC.

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## CALL FOR PAPERS

9th Triennial Meeting ICOM-CC: August 1990,  
Dresden East Germany

In order for papers to be included in the preprints for the next issue, they will have to be submitted by early 1990. Any subject relating to the conservation of natural history collections can be covered. Examples of topics include:- history of preparation methods and preparators, condition surveys of collections, environmental/ storage methods, conservation case histories, ethics of treatments, history of treatments, care of documentation, cost-benefit analysis of treatments, etc. All groups are calling for papers; the entire field of object conservation activity is included in preprints for ICOM-CC Meetings. These are both international and inter-disciplinary. A paper included there can reach a far more diverse audience than in any other professional publication.

Submitted papers are reviewed before acceptance, according to a newly introduced, and more rigorous, procedure. Under guidance from the Working Group Coordinators, an editorial committee will select the papers for publication. The aim of these measures is to achieve high professional standards across the various disciplines. Papers are accepted in the official languages, French or English. If you have any questions about the format of content of a proposed paper, please contact me sooner rather than later. From previous practice, draft manuscripts are required by January 1990 for comments and acceptance. The finalised paper must then be submitted by March 1990, retyped on standard grid sheets. The preprints are published from this camera-ready copy.

The format of ICOM-CC Meetings is being changed in response to the dramatic increase in the numbers attending and papers submitted. Concurrent sessions will be reduced to a minimum, with related Working Group joining together in Plenary Sessions available to the entire conference. Social events, visits etc. will be planned for evenings with one full day for excursions. To fit everything in, the Meeting will be extended to six days. The Conservation Committee is the largest of the International Committees and the Board (all volunteers) does a magnificent job of organising all these functions.

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## ICOM General Conference 1989

The 15th General Conference of ICOM is taking place in The Hague (Netherlands) 27th August to 6th September 1989. This is a large international jamboree of museum personnel. It is a chance to meet with many of those active in ICOM and the wider museum movement. All members of ICOM should have received details by now. If you need more information contact your national ICOM committee (addresses in ICOM News) or ICOM head office in Paris.

## MESSAGE FROM CHAIRMAN

Janet Bridgland  
ICOM Committee for Conservation

The Working Group on Natural History Collections continues to make remarkable progress in providing an international forum for individuals and institutions responsible for the care of this most important aspect of our collective history. The preservation of these collections is as difficult as it is vital; the variety of materials they encompass and their importance for research as well as display provide an unparalleled challenge to the conservation profession.

It is therefore particularly gratifying to witness the ever increasing activity of this Working Group, as evidenced by the growing circulation of this Newsletter. Such regular exchange of information can do much to overcome geographic isolation, but cannot entirely replace the exchange of ideas that occurs in meetings of colleagues with similar interests.

For this reason, I urge those of you who are able, to participate in the next ICOM General Conference which will take place in the Hague from 27 August - 6 September 1989. This conference will offer an excellent opportunity to meet with members of the International Committee on Natural History as well as with members of our own Committee. In the coming months, the Directory Board will be exploring ways of increasing our involvement with other International Committees. Further details will be included in our next Committee Newsletter, as will preliminary information on our 1990 Triennial Meeting.

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## ICOM-CC Sydney 1987

8th Triennial Meeting: A personal view  
C.V.Horie

Sydney and Australia in the spring provided a marvelous welcome to all the delegates. Our Australian colleagues had persuaded the State and Commonwealth governments to provide both financial and political recognition of this international meeting. It may have helped that preserving the heritage had become important in the year before their 1988 Centennial celebrations. The meeting of 450 delegates from 31 countries was well organised by the Australian Committees and ran with smooth efficiency.

The Meeting lasted for 5 days, consisting of one and a half days of plenary sessions, one day of visits and two and a half days for the Working Group sessions. During these sessions, papers were read and discussed, coordinators chosen and joint actions agreed for the next three years. These meetings formalise proposals developed in the informal gatherings which are the most productive parts of the Meeting. Various Working Groups have generated significant advances by international cooperation that would have been impossible by isolated individuals or institutions. Five Working Groups met simultaneously so there was much movement from one to another. All passages led through a central refreshment area where the temptation to stop, talk and drink coffee was too strong - at least for me. Exchanging views and concepts with fellow enthusiasts, but from different cultures and disciplines, is exhilarating. Only slightly less thrilling are the preprints, in three volumes and weighing 3Kg.

Not all the time was spent in the dark corridors of the Hilton Hotel. The various tours in Sydney had opened the doors, and backrooms, of museums to streams of visitors. The Australian

Museum, with a wealth of natural history material, was in a state of flux, to put it kindly. Massive building works were being undertaken alongside (literally) the preparation of objects. This and other museums were responding to the explosion in public interest and funding in advance of the Bicentennial. Under the capable control of Hangay and Dingley (authors of Biological Museum Methods), new mounts of animals were being finished for completely new displays. Many of these are unique to Australia and are not permitted to be exported. They put our re-conserved marsupials in the shade. I also looked around the ethnographical conservation laboratories headed by Sue Walston, one of the prime movers of the Australian Organising Committee. Much excellent work was in evidence, though the cleaning and preening of feathers on Maori cloaks was of particular interest to natural history conservators. Each feather is isolated from its neighbours by a film, cleaned, dried and preened. It was sobering to go to the university museums who were not participating in the State museum activity and refurbishment. University cutbacks were causing the usual contraction, and I had it on the personal word of the Minister that university museums were not to be included in the rejoicing. There were some very good receptions.

Eventually, I escaped from the museum round and walked around Sydney. It is a bustling prosperous city with the oldest European settlements, 200 years of history. The centre is graced with a number of parks. I wandered into one, gradually realising that this was the major botanical garden. European spring flowers were interspersed between the exotic native plants (depending on your point of view). It epitomised the marrying of the European culture and the newly opened continent. Although the contrasts sometimes appeared strange to the newcomer, excellence in both aim and achievement were apparent.

## ANNOUNCEMENTS

**Register of Natural Science Collections in Yorkshire & Humberside**  
Editors: M.M.Hartley, A.Norris, C.W.Pettitt, T.H.Riley and M.A.Stier.  
Yorkshire and Humberside Museums Council (1987), ISBN 0-9512207-0-5

The Register forms the first comprehensive survey of zoological, botanical and geological collections in Yorkshire & Humberside (UK). Public and private museums are covered, as well as universities, colleges, schools and major private collectors. The 343 pages are divided into a main catalogue detailing each collection under its most widely known name (usually the donor or collector) and two indexes giving information by associated collector name and subject. Researchers will find it useful for locating 'missing' named collections or those covering a particular topic of interest, e.g. fossil fish or mosses and liverworts.

This publication is the culmination of eight years work by the curators of the Yorkshire & Humberside Natural Sciences Collections Research Unit and forms the latest in a series of similar publications which will eventually cover the entire British Isles. The publication of the Register has been financed by the Yorkshire & Humberside Museums Council.

Price: £20.50 - including postage  
From: Mrs. J.Platt, Yorkshire & Humberside Museums Council, Farnley Hall, Hall Lane, Leeds LS12 5HA, U.K. Tel. 0532 638909

## Society for the Preservation of Natural History Collections

4th Annual Meeting 23-28 July 1989

The theme of this SPNHC meeting is Collections-Our Treasured Heritage. It is being held in and around Calgary, Alberta, Canada with visits and tours relating to the dinosaur and local interpretative centres. Abstracts, posters (and presumably papers) in English are requested by April 1989. Registration must be received by 15th May 1989, with a fee of around \$50. The meeting is co-hosted by the Tyrrell Museum of Palaeontology, Drumheller and the Department of Biological Sciences, University of Calgary, Alberta.

Address enquiries to:  
SPNHC Conference Secretary, Tyrrell Museum of Palaeontology, P.O.Box 7500, Drumheller, Alberta T0J 0Y0, Canada. Tel: (403) 823-7707, Fax: (403) 823-7131.

## "Spirit" Collections - Conservation of Natural History Collections

One day course 1st June 1989, Manchester University.

Many natural history collections contain neglected, but important specimens preserved in fluids. This course addresses their various problems: methods of fixation, effects of preservatives on the organic materials, rescuing dried up specimens, containers and their sealing, health and safety, management of the collection and its use - actual and potential.

In order to bring together the best expertise, speakers are drawn from around the country, BM(NH), Universities of Cambridge, Glasgow etc. As for last year's successful course on dry vertebrate material, the talks will be available on the day in booklet form.

Cost of the day is £35, including coffee, lunch and texts of the papers.

Further details are available from:  
Dr. G. Murphy, Dept. of Environmental Biology, The University, Manchester M13 9PL, UK. Tel. 061-275-3888  
or Mr. C.V. Horie, The Manchester Museum, The University, Manchester

## Conservation of Natural History Specimens - Vertebrates

C.V.Horie & G.Murphy eds., Manchester Museum and Department of Environmental Biology, Manchester University (1988)

Publications from a one day course at Manchester University in May 1988. The texts concentrate on dry material, principally skin and bones, see the review by Miss L.Bacon below.

Booklet: Conservation of Natural History Specimens - Vertebrates £6.50

Video: Demonstrations of cleaning fur and preparing study skins £15.

Postage: £2

Available from: Dr.G.Murphy, Development Officer, Dept. of Environmental Biology, The University, Manchester M13 9PL, UK

## Summer Schools - Institute of Archaeology (London)

35 Courses are offered in 1989, of which the following might have relevance to Natural History:

Conservation of Archival and Library Materials 26-30 June.

Conservation of Skin and Leather 3-7 July.

Identification of Wood 3-7 July.

Materials for Conservation 3-7 July.

Stone - Technology, Deterioration and Conservation 10-15 July.

Details from: J.Black, Coordinator, Summer Schools, Institute of Archaeology, 31-34 Gordon Square, London WC1H 0PY, UK. Tel. 01-387-9651.

## REVIEWS AND REPORTS

### The conservation of geological material

P.R.Crowther and C.J.Collins eds.,

Geological Curator 4 (7) (1987) 375-474.

Reviewed by: Simon Knell, Keeper of Natural Sciences, Scunthorpe Borough Museum (UK).

The conservation of fossils and minerals has traditionally been the domain of the museum curator. As a result it hardly advanced until a few years ago. Techniques and materials, when compared with those of the archaeological conservator who in many respects is tackling similar problems, were extremely primitive. Any landmarks that have arisen have been the result of isolated workers in the British Museum (Natural History). A.E. Rixon (1976) Fossil Animal Remains: their preparation and conservation Athlone Press, London, was prior to this publication the curator's first reference even though it was soon very much out-of-date. F.M.P. Howie's work on the relationship between relative humidity and the occurrence of pyrite decay was another turning point in the history of geological conservation.

Progress has been slow primarily because research was being undertaken only at the British Museum (Natural History) and no one was looking to see what other disciplines or other countries were doing. Ideas and processes were becoming entrenched.

The publication reviewed here arose out of an international conference of the Geological Curators Group, devised and organised by Chris Collins of Leicestershire Museums, which intended to overcome these shortcomings. It was the first meeting to discuss geological conservation as a subject in its own right and it brought together the experiences of curators and conservators, of archaeologists, historians and geologists, from Britain, Canada and Germany. The resulting publication, produced very economically as a special issue of The Geological Curator, forms both a review and a handbook. Articles on, for example, conservation documentation and strategies for the small museum illustrate some of the needs of the average museum i.e. one which cannot have its own conservation department. Others on health hazards, adhesives and consolidants, and archaeological techniques are invaluable and make this publication an essential one for any laboratory or museum undertaking work on geological material. Unfortunately the discussion at the end of the meeting is not included but it was as heated as any I can recall raising many interesting points from a particularly diverse audience.

Primarily this conference was trying to say that geological conservation needs to be treated as a subject in its own right - requiring its own expertise. This view is becoming increasingly accepted by geological curators but it presents a problem i.e. there are no training courses in

geological conservation therefore we have no professional, in the strictest senses, specialist conservators. In the meantime things will continue very much as they have done in the past but perhaps as a result of this publication all parties will be much better informed. Taking the next step by establishing a regional conservation laboratory is proving less easy but needs to be done before the momentum is lost.

### Conservation of Natural History Specimens - Vertebrates

A Day Course at the University of Manchester, May 1988

Reviewed by: Lousie Bacon, Senior Conservator, Horniman Museum & Library (UK)

This one day course aimed at those who have to care for historic vertebrate material, in particular Zoologists and Conservators, was hosted jointly by The Manchester Museum and the Department of Environmental Biology. As a museum conservator, I have often had to be responsible for the safe-keeping and preservation of natural history collections, relying on outside expertise and development of my own skills to cope with this multifarious discipline. Many objects conservators in Britain find themselves in a similar situation and I found it very sad that I was the only objects conservator attending this course. It is always difficult to attract non-specialists to a conference which they should attend, archaeological conservators have the same problem with attracting archaeologists to finds conservation meetings. The only answer must be that advertising should be targeted specifically to different groups.

The condition of some natural history collections in the UK has been only too graphically reported by Doughty and more recently by Williams. Until training courses in natural history conservation and the appointment of staff to deal with these collections is a reality, it is up to existing conservators, and in the case of vertebrates, zoologists to ensure that collections are maintained in a stable and secure state until professional expertise is available. And, more crucially, in the immediate sense, to be aware of when professional expertise should be brought in.

I found this one day course a unique opportunity to bring the ad hoc bits of information gleaned over the years into a structural whole and I could not have wished for a better planned series of lectures. The well-organised programmed beginning with the properties of the fabric of specimens to their preparation and conservation gave a very good general background to the subject.

Dr. John Kennaugh opened the proceedings with a paper on the structure and properties of skin and bone. His very lucid introduction to this wide field created a useful backdrop to the day. A video followed of Lesley Lacey preparing a bird study skin. The video showed the process from receiving the specimen, recording all the information, to preparing the study skin. This video would be a most useful teaching aid and is available from the Dept. of Environmental Biology Manchester University.

James Dickinson from the North West Museums and Galleries Service gave a brief report on the Taxidermy Conference held in Basle-Berne in February 1988. He gave a brief historical review of post war synthetic materials available for mounting skins, which included polyester resin and fibre glass to the use of silicone rubber for moulding, and poly(vinyl acetate) and acrylics for casting. Polyurethane foam has also been widely used as a mounting medium, but, as came out in the discussion period, this can no longer be recommended as it deteriorates with time - posing a real threat to the

stability of the specimens. The Swiss are currently experimenting with materials for complete reproduction of endangered or extinct species. Reconstructions have been made using a light-weight metal framework covered with fibre glass and Araldite unfilled epoxy CX219. On this framework they have then used Ureol (a Ciba Geigy polyurethane resin product) to attach hair taken from other animals and dyed and cut to match the animal being reproduced. The complete substitution for an original specimen has perhaps been found.

Returning to the preparation of specimens, Dr. Mike Hounsome ran through the various methods in use for the preparation of skeletal material; dry decomposition by burying the specimen, maceration by chemical, water and enzymic means, and decomposition by living dermestid spp. beetle (or anthrenus sp). Unless the dermestarium is well maintained and effectively sealed, this was not recommended for general museum use. An escape of dermestid into a museum collection would cause irreparable havoc. Hounsome emphasised the need to follow the cleaning of bones with de-greasing and he warned of bones deteriorating because of the break down of the fat. These would require conservation.

Velson Horie's paper on damage to skin and bones covered the wide range of deleterious effects through; handling, the environment, preparation techniques used for old and new specimens, biodeterioration, and effects of light exposure on pigmentation in feathers.

Dr. Dick Askew briefly reviewed the types of pests which attack specimens. He followed with the measures needed to avoid pest infestations and recommendations for their treatment. Although some mention was made of health and safety measures, mainly in the discussion period, it was not stressed enough that gloves and respirators fitted with organic vapour filters should be worn when handling any pesticide even those for inclusion in drawers. Also where pesticides have been used a toxic warning symbol should be affixed to the drawer or cabinet so that future users are aware of the need to wear a mask. Attention should also be drawn to the new Pesticides Regulations Act which gives the new conditions for the storage and use of many pesticides in use in Museums. (Ref: Pesticides 1988 available from HMSO. Leaflet pesticides: Guide to the new controls available from Ministry of Agriculture Fisheries and Food.)

Velson Horie returned to give a thorough review of the treatments for deteriorated specimens, emphasising the importance of environmental control and how to achieve it. Conservation treatments for mounted specimens covered cleaning, water and solvent washing, re-shaping, repair and restoration.

A video prepared by Roy Garner and Velson Horie on the attempted cleaning of an old specimen by various water and solvent methods served to illustrate how important it is to provide the right environmental controls to preserve specimens. The case history in question, because it was so badly faded and desiccated was only marginally improved by removal of dirt from the surface.

Sue Cross gave a short paper on display and curation of specimens, which was mainly concerned with the importance of light control.

Mike Hounsome returned to conclude the day's proceedings with a talk on the treatment of specimens for present and future use. The course could be summed up in his sentence. 'We cannot possibly be expected to predict all the future uses for the collections in our care, but at the very least we should ensure that they are in no worse a condition when we leave them than

they were when we came to them.' I would add a rider to that:- Specimens should be better for the care and attention that we give them than when we first came to them.

#### The conservation of geological materials

A week course as part of the Institute of Archaeology (London)  
Summers Schools, 13th - 17th July 1987  
Report by Chris Collins, Course Organiser,  
Assistant Keeper of Geology, Leicestershire  
Museums.

This was the first time than an extended training course has been held on the conservation of geological specimens. It was therefore very much a test to find out how such a training course should be structured, what the content should be and who the course would attract. It was also hoped that it would act as an international forum for geological curators to attend and discuss the state and future training of geological specimen conservation. The course was attended by 18 people from the U.K., Canada and Denmark who represented a wide range of interests from the natural history curator to the specialist archaeological/geological conservator.

The course aimed to cover the main topics involved in basic specimen conservation, though not catering for the cookbook style of conservation which many curators would like. Subjects covered were preparation, material stability, storage, mineral conservation, sulphide (and allied minerals) stability, health and safety, consolidants and adhesives, sub-fossil bone and documentation.

The audience reaction seems to have been favourable and the students have said that they enjoyed and learnt much from the course. However, criticisms have been that there was too much lecturing and not enough practical/interactive discussion and that the section on preparation though necessary could have been shortened to make way for more practical conservation work. On the whole the course was deemed successful and discussions are under way to hold a second and improved course next year.

My thanks go to the Institute of Archaeology for providing us with the vehicle to run the course, and the lecturers for working to make the course such a success. Anybody interested in attending further geological specimen conservation courses should contact:- Chris Collins, Geology Dept., Leicestershire Museums Services, 96 New Walk, Leicestershire, LE1 6TD., U.K.

## ABSTRACTS

## General

3:1 Preprints to "Modern Organic Materials" April 1988 Edinburgh, Scottish Society for Conservation and Restoration (1988).

[Papers on identification, cellulose acetate and nitrate, rubber and plastics collections. Useful when polymers have been incorporated into specimens, e.g. cellulose acetate peels]

3:2 ICOM Committee for Conservation Preprints 1987 8th Triennial Meeting September 1987 Sydney, Australia, ed. K.Grimstad, Getty Conservation Institute and International Council of Museums.

3:3 Manual of Curatorship ed. J.M.A.Thomson and D.R.Prince, Butterworths (1987).

[A large 552pp. compilation covering most aspects of museum practice]

3:4 Conservation and storage: biological collections, G.Stansfield, 289-295 in Abs 3:3.

[A very brief review]

3:5 International Index of Conservation Research, Rome, ICCROM, 92-9077-080-5 (1988).

[A useful guide to progress in conservation]

3:6 Curatorial Care of Works of Art on Paper, A.F. Clapp. New York, Nick Lyons Books, 0-941130-31-2 (1987).

[Useful for archives, labels etc.]

## Environmental/Storage

3:7 Approaches to Pest Management in Museums K.O.Storey, Conservation Analytical Laboratory, Smithsonian Institution (1985).

[A review of the pests, their life histories and susceptibilities, control methods, insecticides and fumigants. Well referenced]

3:8 Is it worth-while re-looking at salt solutions as buffers for humidity control of showcases? E.E.Astrup, 853-858 in Abs 3:2.

[The problems, solved, of salt solutions]

3:9 Propriétés anti-U.V. des films de sécurité, J.J.Ezrati & M.-O.Kleitz, 871-874 in Abs 3:2.

[Use and deterioration of solar control/security films]

3:10 A study of natural materials as RH buffers and application to a showcase, N.Kamba, 875-880 in Abs 3:2.

[cheaper materials such as rice and lentils prove their worth]

3:11 17 years of dehumidified showcases in the British Museum, H.Newey, 901-908 in Abs 3:2.

[Dry conditions successfully achieved]

3:12 Temperature and relative humidity measurement and control in National Trust houses S.Staniforth & B.Hayes, 915-926 in 3:2.

[Judicious use of moderate heating and dehumidification to achieve reasonable levels of humidity]

3:13 Environmental conservation, S.Staniforth, 192-202 in Abs 3:3.

[A useful overview of environmental considerations]

3:14 Formaldehyde: How great a danger to museum collections?, P. Hatchfield & J. Carpenter. 0-916724-64-X, Center for Conservation and Technical Studies, Harvard University Art Museums Cambridge USA (1987).

[a review of current knowledge of the evolution and effects of formaldehyde with current display etc. materials]

3:15 A silicone rubber/microballoon mixture for gap filling in wooden objects, R.L.Barclay & D.W.Grattan, 183-188 in Abs 3:2.

[A flexible, easily worked, filler. Stable]

3:16 The effect on artefact materials of the fumigant ethylene oxide and freezing used in insect control, M.-L.Florian, 199-208 in Abs 3:2.

[A literature survey of the reported effects, with extrapolation to museum materials]

3:17 Application of a new type of pyrethroidal compound on ethnographical textiles, T.Morita, Y.Tujii & T.Matsunaga, 211-214 in Abs 3:2.

[A slow release fumigant, its effect on moth]

3:18 An investigation into resin coatings: study of naturally aged examples, B.A.Ramsay-Jolicoeur, 809-816 in Abs 3:2.

[Resins in picture varnishes and their changes. Many were applied to Natural History specimens]

3:19 Effects of CO<sub>2</sub> fumigation on pH, S.Sanders, 945-946 in Abs 3:2.

[preliminary experiments]

3:20 Methodology used in insect pest surveys in museum buildings- a case history, M.-L.Florian, 1169-1174 in Abs 3:2.

3:21 L'oxyde d'éthylène. Utilisation et limites. Actions secondaires avec un résidu de traitement antérieur, M.-O.Kleitz, 1175-1182 in Abs 3:2.

[combustion of textiles caused by reaction between sodium pentachlorophenate and ethylene oxide]

3:22 Integrated pest management in the United States National Park Service, D.Pardue, 1183-1188 in Abs 3:2.

[Prevention in order to obviate cures]

3:23 Fumigation, choice of fumigant and design of facility, A.W.Postlethwaite, 1189-1196 in Abs 3:2.

## Botany

3:24 A two-dimensional equation of state of water absorbed on the surface of cellulose: a tool to better understanding the artificial ageing of cellulose materials, P.Calvini, 353-356 in Abs 3:2.

[Refining the tools of accelerated ageing, primarily of paper]

3:25 On the foxing-causing fungi, H.Arai, 1165-1168 in Abs 3:2.

[Tracing the source of foxing on paper]

3:26 The potential long-term effects of gamma irradiation on paper, F.J. Butterfield. Studies in Conservation 32 (1987) 181-191.

[Gamma radiation causes damage to cellulosic materials, accentuating that of the ageing processes]

## Earth Sciences

3:27 An experimental ammonia gas treatment method for oxidized pyritic mineral specimens, R.Waller, 625-630 in Abs 3:2

3:28 Conservation and storage: geological material, F.M.P.Howie, 308-318 in Abs 3:3.

[A useful review]

3:28 Conservation of geological monuments as heritage items, B. Hardy. Bulletin Institute for the Conservation of Cultural Material 13 (no.1 & 2) (1987) 107-115.

[The need for good public relations]

## Zoology

- 3:29 An investigation into the ultrasonic cleaning of New Zealand Maori cloak materials, G.Barton & S.Weik, 189-194 in Abs 3:2. [Cleaning agents and their effects, particularly on feathers]
- 3:30 Electron microscopic and biochemical investigation of parchment, N.L.Rebricova & N.I.Solovyova, 1197-1200 in Abs 3:2. [Effects of proteolytic bacteria on skin]
- 3:31 Conservation and storage: vertebrate material, G.Y.McInnes, 302-307 in Abs 3:3. [A review of potential problems]
- 3:32 The conservation of two pre-dynastic Egyptian bodies, C. Johnson & B. Willis. Conservation of Ancient Egyptian Materials; S.C. Watkins & C.E. Brown, Eds., United Kingdom Institute for Conservation Archaeology Section, Bristol (1988) 79-84. [Describes the softening with heat and laying down distorted skin]
- 3:33 Recent Advances in Leather Conservation, S. Fogle ed. Washington, Foundation of The American Institute for Conservation of Historic and Artistic Works, 0-933098-04-9 (1985). [The proceedings of a course on leather conservation]
- 3:34 The microstructure of collagen, B. Haines. in Abs 3:33 8-9.
- 3:35 Conservation of an aboriginal wallaby skin water bag at the Australian Museum, T. Clark. in Abs 3:33 62-64.
- 3:36 Problems in treating natural history specimens, J. Stone. in Abs 3:33 88-89.
- 3:37 Conservation of Natural History Specimens-Vertebrates, C.V.Horie & R.G. Murphy Eds., Manchester, Department of Environmental Biology and The Manchester Museum, 1-871373-00-x (1988). [Proceedings of a course on dry preserved vertebrate material]
- 3:38 Structure and properties of skin and bone, J.H. Kennaugh. in Abs 3:37 1-7.
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- 3:40 Recent developments in taxidermy, J. Dickinson. in Abs 3:37 16-18.
- 3:41 Methods of bone preparation, M.V. Hounsome. in Abs 3:37 19-26.
- 3:42 Damage to skin and bone, C.V. Horie. in Abs 3:37 27-40.
- 3:43 Pests, pesticides and specimens, R.R. Askew. in Abs 3:37 40-48.
- 3:44 Treatment for deteriorated specimens, C.V. Horie. in Abs 3:37 49-62.
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- 3:49 Value and potential of the collection resource, T.L. Yates. in Abs 3:48 9-17.
- 3:50 Fluid preservation of specimens, E.M. Jones & R.D. Owen. in Abs 3:48 51-63.
- 3:51 Historical aspects of collection conservation in Australia, J.M. Dixon. in Abs 3:48 157-172.
- 3:52 Hungarian Natural History Museum: Care of older specimens, A. Demeter & G. Topul. in Abs 3:48 173-177.
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