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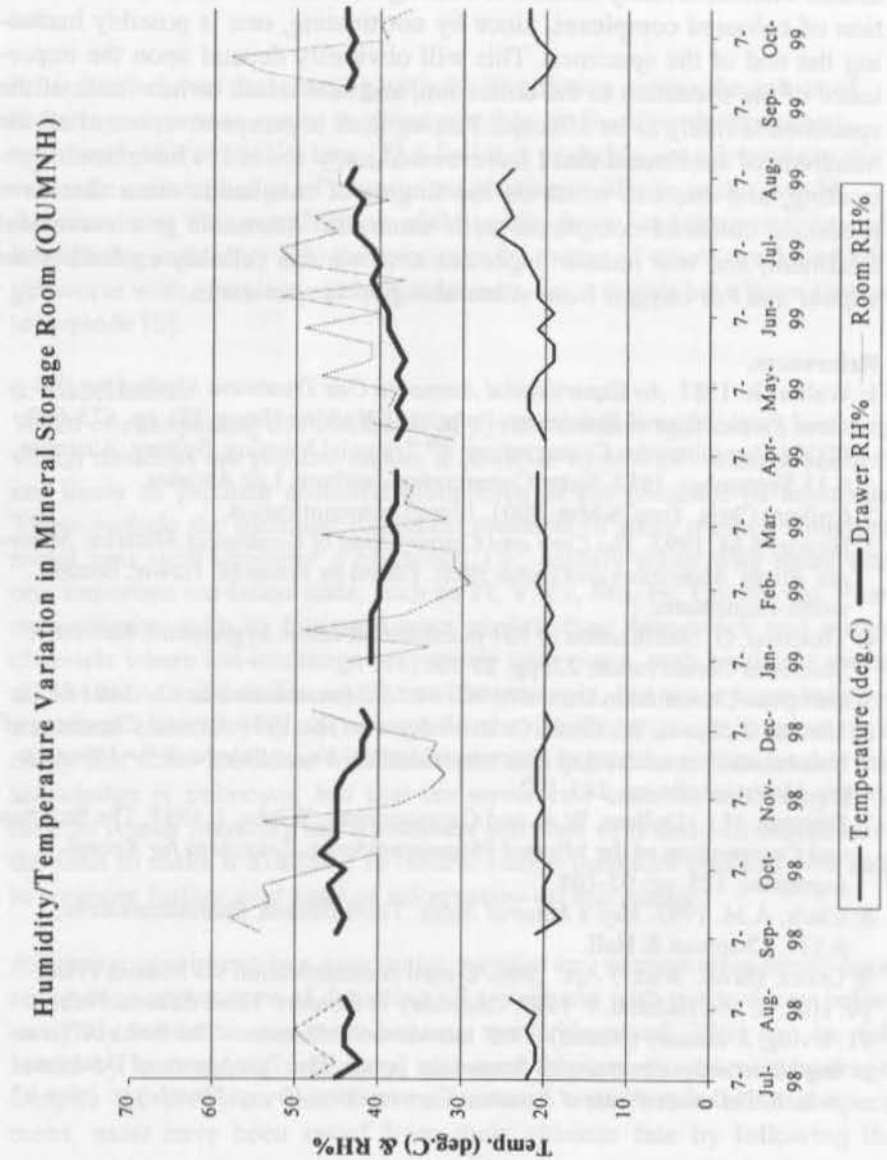
Appendix 1



SOCIETY FOR THE PRESERVATION OF NATURAL HISTORY COLLECTIONS

15th Annual Meeting, 8th-14th July 2000, Halifax, Nova Scotia, Canada.

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This year's SPNHC meeting, themed on Marine Biology, was held in the scenic city of Halifax, Nova Scotia, and hosted jointly by the Nova Scotia Museum of Natural History and the Geological Survey of Canada (Atlantic). In total, 115 delegates attended, including a Cuban, a Bermudan, two Dutch and four Brits. (Rob Huxley, William Lindsay, Julian Carter & Paul Brown), the rest being Canadians and Americans. Many delegates stayed at Shirreff Hall, part of Dalhousie University student accommodation.

The first official activities of the week consisted of field trips; whale watching in the Bay of Fundy, Nova Scotia's south shore, and the Joggins and Parrsboro Geology Tour. This delegate went on the latter, a coach ride through the forests and lakes of the glaciated Cambrian and Ordovician slates and greywackes of the central area, to the more agricultural Carboniferous red sandstones to the North. We visited the Fundy Geological Museum, Parrsboro, where we were guided round the small but well equipped fossil preparation laboratory by Tim Fedak, who showed us dinosaur fossil preparations currently being worked on. The public galleries had a good mix of real specimens and interactive models, with views over the Parrsboro Creek, just yards away. The Bay of Fundy reputedly has the highest tides in the world, so one hopes that this museum is built where it will not be inundated by abnormal tide and weather conditions! We then moved to the coastal cliff exposure of Carboniferous sandstones and coal seams, to see where the best of the reptile remains have been found. We were provided with a free Nova Scotia geology map and a series of papers on the local geology.

Monday was committee day and so non-committee members toured the town of Halifax visiting other Museums. The Maritime Museum of the Atlantic has a collection of small boats and interpretative exhibits, including the ex-WW2 Flower Class Corvette HMCS Sackville and the Canadian Hydrographic Service ship 'Arcadia'. The Halifax Citadel National Historic site, a Georgian fort with interpreters dressed as 'redcoats' and Union Jacks flying, was also visited. Some took a bus out to Peggy's Cove in the rain to study the glaciated granite scenery and watch the gale-blown Leach's petrels off the lighthouse point.

Most of the conference sessions were held at the Life Sciences building at Dalhousie University, a short walk from our accommodation. The conference proper started on Tuesday morning with opening and welcoming remarks. The outgoing President, Sally Sheldon, talked of the problems that SPNHC members have faced in gaining recognition for collections management as a valid and desirable profession. The keynote address consisted of a photographic exploration of the wreck of S.S. Titanic by Steve Blasco. After lunch, the first session themed 'building a better environment' commenced with Robert Huxley and William Lindsay of the NHM, presenting their talk 'Building a safer environment for collections: bringing the specimens back into focus'. The use of qualitative risk assessment in re-housing and moving of collections was examined, in parallel with health & safety legislation, all in the context of planning moves into the new Darwin Centre buildings at the NHM.

Next to speak was James Bryant of the Riverside Museum, California, who discussed the conservation and documentation of Victorian sea & shore bird specimens. Franklin Pember's 250 marine bird skins and egg sets have been subjected to packing, cleaning and condition assessment projects. The hazards associated with old taxidermy specimens and the safety measures employed were considered. Cleaned specimens were placed into original display cabinets with minor refitting to control relative humidity and off-gassing from the cabinets and to improve lighting and visibility. In 1999 an old egg collection was found at Riverside still enclosed in its 19th Century packing. The eggs were unpacked and the packing methods documented.

Risk assessment and conservation planning at the Canadian Museum of Nature, Ottawa, was the subject of Rob Waller's presentation. They have moved into a purpose-built, collection-holding building and many measures have been undertaken to reduce risks to the collections. Comparisons between two risk assessments illustrated the changes in risk perception, changes in understanding of and ability to quantify risk and changes in risk magnitude. Repeated risk assessments have greatly increased awareness of collection care issues and changes in risks to collections over time.

David von Endt from the Smithsonian Institution gave us a comparative study of collagen and keratin stability in museum storage fluids. Both materials were heated in 70% ethanol, 70% ethanol + 1% formalin, and 50% 2-propanol. Specimens were then weighed and concentrations of amino acids measured. Stability of bone, skin collagen and hair keratin varied in the different liquids. Skin collagen was less stable than hair keratin and the presence of formalin improved stability of collagen but not of keratin. Differential stability may require compromise in preservative used. The use of 2-propanol was found to be least effective.

Delegates then moved venue to the Nova Scotia Museum of Natural History for a series of Special Interest Group meetings. This delegate attended the Conservation SIG where the 'top ten' priorities for natural history collection conservation research were listed (from Paisley Cato's survey of SPNHC membership). Not in order of preference, these were:-

- Impact of preparation materials and methodologies on chemical and physical properties of specimens.
- Impact of preparation materials and methodologies on scientific utility of specimens [DNA etc.].
- Development of preparation methodologies that maximise scientific utility of specimens.
- Impact of treatments on the scientific utility of specimens.
- Methods to assess, systematically, the condition of specimens over time.
- Methods to assess, systematically, the condition of a collection of specimens over time.
- Methods to assess risk to collections to identify rational priorities for

collection preservation investments and research.

- Proper relative humidity and temperature parameters for a general collection.
- Materials specifications for containers.
- Methods for repair/restoration of damaged specimens.

There followed tours of the museum's top floor stores/work areas overlooking the Citadel. We were reminded that Nova Scotia Museums are all under one management system and can share resources and staff. The birds/mammals tour was led by Andrew Hebda who told us about the 2500 bird skins, 300 skeletons and a backlog of 3000 specimens waiting in the freezer. All are databased using their own MIMS system. Much of the collection was housed in grey metal cabinets with 12 wooden drawers each, made by Wards of Rochester, New York State. Labels on cabinets advertised the use of Vapona as an insecticide. The enclosed use of Vapona is illegal in the UK. The Entomology tour was led by the retired Barry Wright who is expert in microleps, coleophorids in particular. He talked about the many introductions of insects into Nova Scotia and showed the long series of the new pest noctuid *Noctua pronuba* (the common European Large Yellow-Underwing moth). He also discussed the Brown Spruce Longhorn *Tetropium fuscum* attack on Spruce in Point Pleasant Park and attempts to control it with flight interception traps, possibly followed by clear felling of many trees in the near future.

The Botany tour by Marianne Zinck (author of the Nova Scotia Flora) reported that the building had steady RH and temperature conditions and had no *Stegobium* beetles. Linen tape is used to affix specimens onto herbarium sheets and there is only minimal use of Mylar envelopes. She told us of the orphaned algae collection. John Gilhen guided us through the 10,000 herpetological and 75,000 fish specimens, much of the material in plastic containers, which have a lifetime of only 10 years. He mentioned the many vagrant fish species that arrive with the Gulf Stream and from the Eastern Atlantic. Specimens are collected from each province of Nova Scotia to illustrate local variation. Derek Davies showed us the Marine invertebrates and discussed the tetrad atlas work on Molluscs which reflects the geology by the presence/absence of suitable minerals for shell formation. As with the fish, the geographic position of Nova Scotia brings in many introductions including our familiar shore crab, which has been

spreading north along the east coast for some years at about walking pace! He also puzzled about how the European forest species *Cepaea hortensis* (White-lip Snail) could occur on local barren offshore islands and in local deposits of 3500 BC vintage. Could they have arrived with the ocean-travelling pre-Columbians from Europe? Then followed an 'ice-breaker' in the public galleries with local beer from the Garrison brewery, good food and a jazz band, 'The Harbour Trio'.

For Wednesday's sessions we returned to the Dalhousie Life Sciences Centre. The first session 'Cast in Stone' was presented by Deborah Skilliter of The Nova Scotia Museum of Natural History who told us of a planned travelling exhibition of trace fossils, and she elaborated on casting them. First a RTV silicone rubber mold is made of the track, trail, burrow, boring or coprolite using the two-component Smooth Sic 912 system. Casts are then made using Modified Gypsum which consists of powdered gypsum, resins and hardeners and is durable, inexpensive, has low toxicity and is easily coloured.

Next to speak was Robert Grantham, also of The Nova Scotia Museum of Natural History, who told the story of how they found two Mastodon skeletons in a local gypsum quarry, and how they lifted and conserved them. Both are considered to be 80,000 years old. The first specimen was rather wet so cling film and polyfoam were used instead of plaster to case the bones for lifting. In the laboratory, the wet bones were kept in humidity chambers where they attracted fungus, so they were moved to tanks of 30% methanol and then slowly dried and conserved with Aquasol WS24 and Aqualoid adhesive. The second specimen, an immature, was in a dry state and so was less problematical to conserve.

Following on was Tim Fedak (who had shown us the Bay of Fundy Conservation laboratory on Sunday) who talked about conservation problems posed by a compressed and fractured Jurassic dinosaur, and other reptile bone finds. The high tides erode the sandstone cliffs rapidly but the fossils shrink as they desiccate and also suffer from sea-salt deterioration.

Then came Andrew Hebda and the problems he has with the appropriation of whale bodies and preparing them as skeletons. He had recently used a historic house site, out of town, to de-flesh a Right Whale body using in-

terpretative information for visitors to the site.
After tea, the present and future presidents of SPNHC gave their views of SPNHC, past, present and future in a session entitled 'After the Millennium'. Rob Huxley briefly discussed BCG, GCG and NSCG in Britain, asserting that "you will be assimilated" by SPNHC and that "resistance is futile" in a 'Borg' like (Star Trek) manner!

The next session after lunch was entitled 'A moving experience' and began with a talk presented by Oskar Brandenburg and Andries van Dam about the methods of packing, transporting and storage of the anatomy collection at Leiden. The collection consists of 20,000 fluid and dry specimens and 1.3 million microscope slides. Transit risks will be minimised and storage and accessibility of the collection will be improved.

Then we heard of the problems that Lori Benson et. al. at the Science Museum of Minnesota faced when staff members packed and moved 1.75 million natural history specimens. Methods of packing, time management of staff, co-ordination and training of volunteers, interdepartmental communication, storage and transport issues were discussed and staff injuries exhibited!

James Cordeiro of the American Museum of Natural History listed common mistakes to avoid in large-scale collection relocation. The AMNH is currently relocating many of its invertebrate collections to a new storage facility. Specimens from 26 phyla, in ethanol and formalin, are to be moved to 650 single door units mostly on compactors. Written protocols and general recommendations from the Invertebrates Division may be of help for other institutions planning similar moves.

Session four; 'Learning, knowledge and collections' commenced with Ingrid Birker of the Redpath Museum, McGill University, Montreal, who talked about how they have made a university natural history collection into a meaningful learning experience. Even with visitor research, the nature of museum learning is difficult to measure and lacks coherent theory. Visitor behaviour, testing of exhibit parameters and evaluation of visitor experience has been used to measure acquisition of knowledge and understanding.

James Bryant of the Riverside Municipal Museum, California, discussed a packing method for an historic lichen collection. During 1999, the Jaeger collection was packed into stable, acid free materials making it more accessible and affording greater protection. The collection was also catalogued with descriptions and images using the Museum's ARGUS database software.

Jenny Pestovic told us of the 1999 Faber award and how their University collections are being improved as an education resource. University teaching and research collections with shortages of funding and space have expanded their roles in public interpretation. Jenny sent out a survey form to 262 museums and institutions of which 110 returned data. The survey identified the level of public education and research activity where public awareness of the collections, collection use for college teaching, faculty and staff involvement in public education and training of students in museum work. Case studies provided models for curators seeking to enhance public awareness. The results have yet to be fully analysed.

Jenny Leopold of the University of Kansas Natural History Museum described the 'Specify' Database management system and how it sustains their bio-diversity collections infrastructure. Historic data is often inaccessible or not available on databases. Many in-house databases are not designed to serve the greater community. The few commercially developed systems are expensive and with limited functionality and security. What she suggested you need is 'Specify', a robust, multi-taxon system with configurable interface, visual query and report tools, access to taxonomic and geographic file information and field-level read and write security, documentation and tutorials and help-desk user support. It is a consistent community computing platform for biological collections and future developments will include internet access to specimen data.

Posters and trade stands were available for perusal during refreshment breaks. Posters included:-

- Susan Fishman-Armstrong (Texas Tech University): the incorporation of bar codes to existing Museum databases.
- Raegan King (Texas Tech University): electronic field data capture using Wildcat III.
- Richard Monk (Texas Tech University): e-vouchers and digital im-

agery in natural history collections.

- Daniel Faber: design, creation and long-term maintenance of black & white digital images.
- Robert Baker (Texas Tech University) Global Information System co-ordinates assignment to classical museum localities.
- Stephen LeMay (Illinois): the manditory registering and monitoring of Institutional and privately owned natural history objects.
- Susan Woodward (Royal Ontario Museum): Triage work done to treat a webbing cloths moth species outbreak in an open storage area of taxidermy mounts.
- Gretchen Anderson (Science Museum Minnesota): improving laboratories visible to the public.
- Paisley Cato: the Survey of SPNHC membership on priorities for Natural History Collections Conservation Research.
- Lorraine Cornish (NHM London): cleaning fossils with lasers.
- Adrian Doyle (NHM London): managing a barrier film microclimate enclosure.
- David Gray (NHM London): replica production of the Maidstone Iguanadon.

That evening, delegates toured Halifax Harbour on the Harbour Queen in warm sunshine and then tucked into a lobster dinner at 'Murphy's on the Water', followed by a rock band 'Johnny and the Escorts' and dancing till late!

On Thursday, the fifth session 'Humans & Nature' started with Wayn Lyons describing methods of conservation of a human foetal teaching collection and the use of Magnetic Resonance Imaging for internal examination. James Cosgrove of the Royal British Columbia Museum then discussed a frozen human body found in a glacier. They communicated with the local 'First Nations' people about the discovery and formed a committee with them to agree as to what conservation and research could be done with the body. The remains were frozen at the same temperature and relative humidity as the glacier and wrapped, so as not to be contaminated by the modern environment

Daryl Fedje gave an absorbing talk on the finding of a prehistoric stone

tool on the continental shelf off British Columbia. Digital terrain imaging has revealed the drowned late-glacial landscape of the shelf. The stone tool was found at 150 m. depth and is the first tangible evidence of human occupation of the shelf in the Holocene.

After coffee, the SPNHC AGM took place where Sally Shelton relinquished her Presidency to Suzanne B. McLaren and committee reports were presented and awards given. The President's Award went to Julia Golden, who was unfortunately absent, for her services to SPNHC and to the collections care profession. There was a call for the membership to volunteer to sit on committees. The presidents, past, present and future gave an amusing, musical rendition of their shared plight.

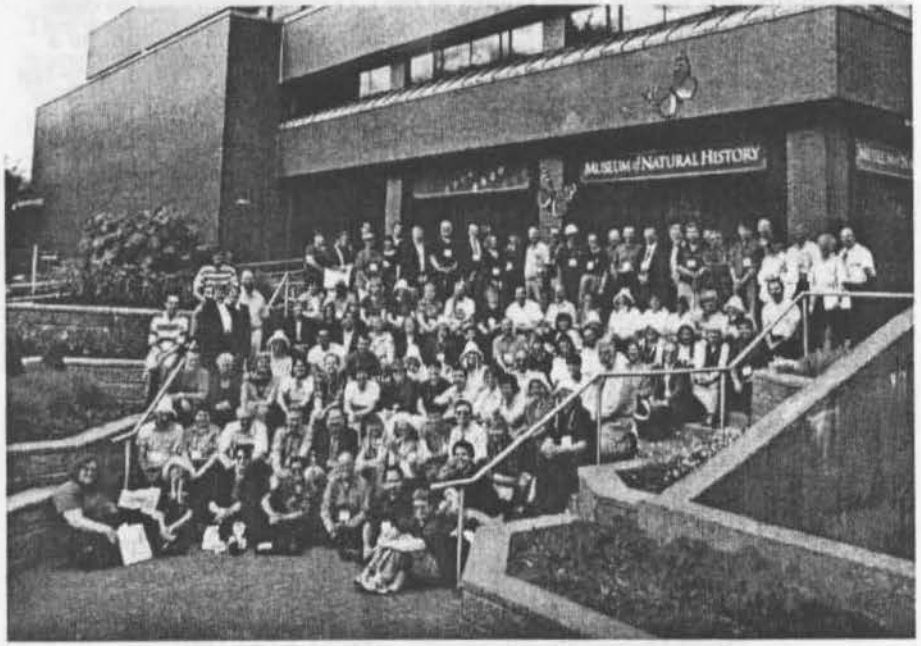
Delegates were then bussed to The Bedford Institute of Oceanography where a sumptuous bar-b-q had been laid on for us. There followed the last session of the conference, entitled 'marine heritage', with Paul Macnab demonstrating his virtual computer CD-ROM underwater tour of Sable Gully, the largest submarine canyon in eastern North America. The CD had a virtual journey through the canyon, with descriptions of ocean currents and temperatures, and resident plant and animal communities with pictures and sounds. Free copies of the CD were distributed to delegates! John Shaw then presented his argument for why there should be a search for the sunken remains of the 'mighty' H.M.S. Hood and a deep-sea exploration of the wreck attempted. Gordon Fader illustrated the methods of side-scanning sonar for illustrating the submarine topography and for pinpointing the many wrecks of Halifax Harbour, illustrated as colourful maps. Some of these wrecks were not known until this survey was carried out.

There followed tours of the Bedford Institute which houses many ocean sediment core samples which are in halves (one half stored and one half analysed). Storage of cores is in long plastic gutters held on dexion racking; also some on roller racking and some in cold storage (the older material dries out so needs to be stored cold). We saw the invertebrate identification laboratory where four parataxonomists identify indicator species. They are studying the effects that fishing has on Benthic habitats. We also had a potted history of the Institute and were shown items of historic oceanographic and hydrological equipment.

The bus ride back included a guided tour of Halifax with information ably imparted, by Alex Wilson, on the explosion of a munitions ship in 1917 which killed 1000 + people and we saw the Martello Tower built in 1790, in Point Pleasant Park.

Friday was spent at the Nova Scotia Museum of Natural History attending the Permits Workshop. This covered permits for agriculture, Health & Safety, CITES and cultural property. Much of the information was slanted toward the problems and legislation in Canada but the CITES information was of interest. The information presented at this workshop was produced as a bound volume with the disclaimer that the contents represented the opinions and experiences of the presenters and was given as guidelines only.

Thanks go to the co-chairs Iris Hardy and Alex Wilson for a stimulating and enjoyable conference. Next year the 16th SPNHC will be held at the California Academy of Sciences in San Francisco from 21st-26th June, 2001 (further information from Jean DeMouthe CAS, email: jde-



Transferring biological specimens from formalin to alcohol.

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In these days of greater Health & Safety awareness many curators are reviewing their fluid-preserved collections and transferring them from carcinogenic and dermatitic formalin to alcohol. Although this may seem straight-forward enough there are many traps and problems along the way.

First - are the specimens going to benefit from the transfer? Some will have been fixed and then preserved in special fluids, the nature of which is rarely recorded on the label (eg. formol glycerine), plant material may be preserved in 'Kew mixture' or a chlorophyll colour-preserving medium, transferring to alcohol will cause the chlorophyll to leach out (Moore, 1999).

Second- will the transfer improve DNA preservation? If the specimens have been fixed in 10% formalin (= 4% formaldehyde) then the DNA integrity will have been masked by the formaldehyde This reaction is non-reversible. Fresh specimens for molecular studies need to be stored in a minimum of 90% alcohol (Criscuolo, 1994).

Third- the transfer may seem to satisfy Health & Safety from the aspect of the personnel breathing in the fumes, but the transfer to alcohol brings in extra problems concerning flammability of the fluid. The added risk of faster evaporation (especially during Summer) means that more monitoring and topping up needs to be carried out. Keep in mind that as alcohol evaporates from a jar, the residual solution becomes dilute (Carter, 1995).

Fourth- most specimens will benefit from the change. Formalin requires buffering and does not fix lipids (only preserves them), alcohol dissolves lipids out and does not require buffering.

Fifth- wear surgical gloves - alcohol dehydrates the skin and can lead to dermatitic problems.