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conservators in favour of methyl cellulose which is more stable.

Several other presentations addressed the use of inks in label writing and the accessing of specimens. The permanence of inks from both pens and printers was compared by assessing the extent of fading, solubility, and adhesion. It was interesting to see the degree to which these properties varied. The best pens were found to be Rotring 17, Pigma and Marsgraphic pigment liner., but the printers whilst having some advantages, were limited in their usefulness. For example bubble-jet is soluble in water and this may present problems in recovering specimens following a water related disaster (e.g. fire and flood).

Julia Fenn (ROM) presented a talk at the main conference on the reactions of chemicals on plastics. She deduced that over a period of time several pesticides may have been applied to the same specimen and almost invariably, such treatment will not have been documented. Moreover, she discovered that the use of several pesticides in succession may have a synergistic effect on plastic deterioration although a combination of a few pesticides have little adverse effects. These effects include changes in the stability of the plastic, its pH, opacity and increased brittleness.

At the herbarium workshop Julia concentrated on selection methods used in choosing suitable plastics for specific uses. Tom Strang (CCI) addressed the effects of heat on plant specimens during pest control. He showed that by placing the material in a sealed chamber heated to 55°C (131°F) and maintained at a relative humidity of 50%, that after eight hours all the proteins were denatured, destroying all stages in the pest's life cycle. DNA, however, is affected to a lesser extent, some seed remaining viable and capable of germination following such treatments. The use of relatively high temperatures as a mean of pest control went initially against the grain since most institutions are accustomed to freezing their specimens. In general, $Q_{10} = 2$, that is for every 10°C (50°F) rise, the rate of chemical reaction doubles. Thus, heating specimens will accelerate chemical changes and may result in the loss of wax and solvents and may cause damage to membranes, cuticles and hairs. Numerous preliminary tests have

been conducted and so far there seems to be little evidence of immediate damage to specimens. Consequently, the use of heat presents many advantages especially as it reduces the time required to treat collections. However, the long term effects require careful monitoring since the effect of heat on DNA and the vast array of complex chemicals found within lichens remains largely unknown.

The second day of the workshop concentrated on the herbarium as a source of DNA samples, the correct code of conduct while working on a herbarium specimen and the conditions required to prevent DNA destruction. I found this a very important session as I felt it gave guidelines to areas which had previously been neglected. Inevitably, this led to lively discussion.

The four days in total were a mine of useful information and the conferences were conducted in such a way that an enjoyable time was had by all.

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Managing the Modern Herbarium

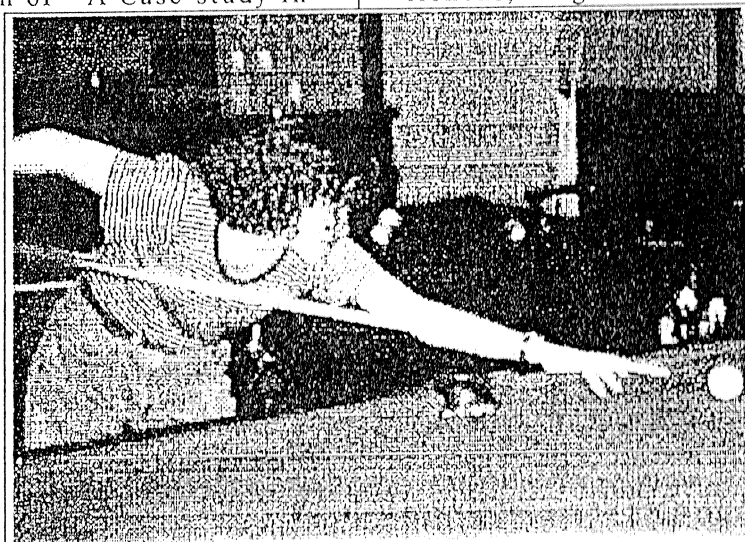
With no time to recover from the packed and invigorating programme of the SPNHC conference, 95 delegates including myself ploughed straight into the training workshop 'Managing the Modern Herbarium'. This ambitious event was organised by Ann Pinzl (Nevada State Museum) and Deborah Lewis (ROM). Those from the conference who weren't herbarium orientated could go on a tour of the ROM's collections and facilities, or (and I can't remember seeing this in the programme) visit Niagra Falls, go up the CN Tower, 'shop' etc.! Anyway we die-hards arrive at Monday 8am to register for what was to become two days of discussions, activity and productive debate.

John Townsend, a preservation consultant and information specialist began the first day by presenting a talk on 'preventative conservation' and how an effective programme of this could be a tool for 'managing' the deterioration of natural history collections. John identified the four factors which contribute to this inevitable deterioration: biological, physical, chemical and environmental, and how by slowing or interrupting these processes, a long term

preservation programme can be set up. The latter of these agents of deterioration was then discussed by William Lull, in a talk entitled 'Herbarium Building Design and Environmental Systems'. This followed on from a paper presented the day before at the conference on heating, ventilation and air conditioning (HVAC) systems and concentrated on the challenge of controlled humidity, temperature and light for a collection of varying needs, such as herbaria, fungi, wet specimens, etc. William is currently working on the renovation of the NY Botanic Garden's herbarium. In 1991 he advised on the new environmental design for Brooklyn Botanical Garden. Kery Baringer, a curator at this institution followed with an illustrated presentation of 'A Case-study in

Modern Herbarium Design'. This was a brilliant example of a 'before and after' and I think many came away feeling "if only...". Tom Strang from the Canadian Conservation Institute presented an amusing collection of holiday slides(?) with some information on pest control mixed in. Many(!) graphs were shown (if your eyes could register the information quick

enough) depicting the effects of thermal, atmospherically controlled and conventional fumigant methods on seed viability. Let it be known, Tom has a graph for everything! In the afternoon four papers preceded a panel/audience discussion on the chemistry of herbarium materials and storage. Greg Hill (National Archives of Canada), Stephen Williams (Museum of Texas tech. University), Jane Down (CCI) and Julia Fenn (Conservation Dpt. ROM) presented a conservation perspective to compliment a traditionally curatorial one. This was an exciting follow-on from subjects raised at the conference 'Conservation and the Herbarium', Liverpool '93. Here was evidence of active research being carried out specially on behalf of herbaria concerns.



Donna Hughes 'showing some form' clearing the table versus Rob Waller. Toronto 1995.

Greg, a paper conservator, discussed various tests used to check the stability and compatibility of mounting and storage materials. Stephen (past president of SPNHC), described spot-checks for analysing the longevity of inks, including the increasing use of bar-codes. Jane, a conservation scientist, presented the findings of research carried out by CCI into adhesives used in herbaria. I found this extremely interesting in view of my own survey carried out on materials used in the UK. Julia, a conservator, described several tests designed to check the type, and therefore suitability, of plastic packaging often used in museums. Even though plastic is not yet a major material for herbaria, it is used occasionally to contain seeds, beans, lichens, fungi etc. As few of the panel

actually worked within the herbarium environment, much of the debate posed by the audience was bounced back around the auditorium, though their professional advice was indeed noteworthy. The day's presentation closed with an address by the President

Carolyn Rose on SPNHC as a resource for conservation and collection care and John Townsend who presented a synopsis of the day's findings and discussion. This prepared us all nicely for the evenings ensuing herbarium workshop/bazaar (yes we all worked till 10pm, while others got the drinks in!). In between we all had a tasty dinner in the University of Toronto Faculty Club, where all thanks were given to the speakers and organisers.

So to the Bazaar. Was it bizarre? Well if you call 100 people getting very excited about compactor systems, mercury poisoning, glue, paper.... then, yes! The evening was a great success due to everyone's commitment to join in, whether debating methods of fumigation or rolling their sleeves up to spread glue over glass

with Judy Gibson (San Diego NH Museum). In all 16 posters were displayed, many with hand-outs to take away. The trade fair stands were here again (from the AGM). We also had a slide presentation of a project developed at the Canadian Museum of Nature on the design and construction of a 'protective' Type specimen folder. I had my doubts about the feasibility of this prototype design due to its vulnerability to dirt migration, not to mention how time consuming and expensive its application would be. Anyway, many came away impressed and this was what it was all about; sharing ideas and experience. Hats off to Deb Metsger for organising the Bazaar (and also managing to sit on a committee meeting that evening!)

Tuesday's theme was a contemporary issues facing herbaria and began with Rusty Russel, Smithsonian Institute, discussing the use of bar-codes, such as tracking and providing accountability especially for loans. Rusty is also involved in botanical projects on the Internet and enlightened us to its future application within herbaria e.g. holding site images, photos of living plants, microscopic images etc.

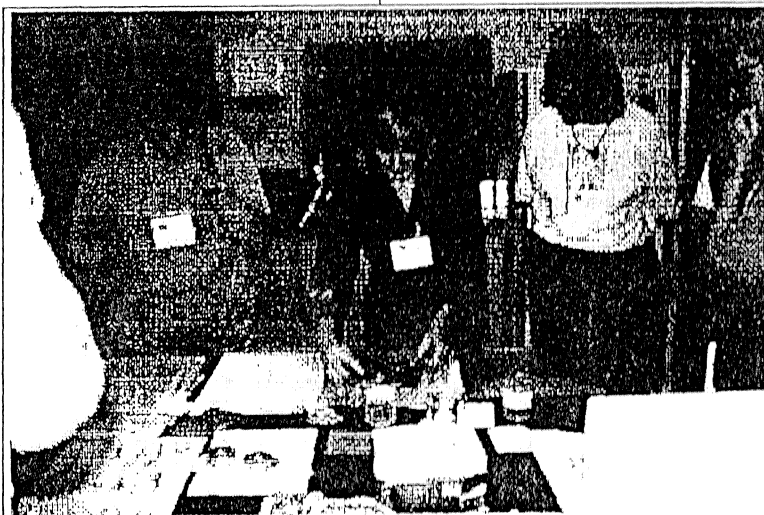
The rest of the day consisted of a symposium on "Destructive sampling and molecular systematics : are we moving toward a consensus?" Sampling was discussed from a 'provider' perspective by Emily Wood, collections manager at the Harvard University Herbaria. Here they have drafted a policy statement and authorisation form for the application of destructive sampling. The contents of this were described and followed by posing questions for discussion: should one be forming a subset herbaria of samples? And how can they be stored in the long term for stability? Bo Jansen, University of Texas, presented a 'user' perspective, discussing the advantages of using herbaria, rather

than fresh, material for DNA studies and describing DNA isolation methods. A survey showed that herbaria specimens are used in nearly all the research labs (SA), but in most cases only about 10% of DNA is currently obtained from preserved material. Issues affecting DNA sampling of mycological collections were discussed by Gregory Mueller. The 'destructive' issue is not the same, as virtually all examination of fungal specimens require dissection and many genera can only be identified by spore analysis. There is a need for research into preservation techniques for mycological material, also DNA extraction and amplification methods for certain taxonomic groups.

Preceding an open discussion of the day's topic James Whitfield and Mark Engstrom presented papers on destructive sampling from a zoological perspective. I am afraid I did not attend these two talks (by now the amount of information and the sun had got to me!) but I returned for the closing of the symposium which posed the question: 'Where do we go from here?....'. Policy statements and

objectives were discussed and agreed upon by everyone. These will be available hopefully in the form of a post conference SPNHC publication. SPNHC hope to take this workshop 'roadshow' style to different venues across the states. Myself and a couple of other delegates (on the wave of enthusiasm!) expressed interest in staging a UK workshop in 2-3 years time. Who knows?, but we definitely have to keep this momentum of concern going.

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Lindsay Wodruff, of the Botanical Institute of Texas demonstrating an adhesive for mounting herbarium specimens