Mail Irradiation....*Continued from page 9*

5. Summarizing the information as it pertains to typical collection specimens exchanged by natural history museums and research laboratories and transported by mail, the following concerns emerge.

a. Living specimens (seeds, cuttings, etc.) will be killed by this irradiation.

b. Materials of cellulosic composition, especially plant fibers and paper, will be quite seriously affected. They will lose significant tensile strength and will become more brittle, while the induced chemical changes, chain scission and oxidation, will accelerate their aging processes. Discoloration is also to be expected. Oxidation also will result from interaction with ozone formed in air during the irradiation; while one may expect efficient ventilation at the radiation equipment, ozone also will be formed within the enclosures of the mailed materials, where the concentration could range in the tens of ppm.

c. Materials of proteinaceous composition, while less vulnerable than the cellulosic ones, still can be expected to be affected at the proposed dose levels in terms of physical changes (embrittlement of skin products, loss of fiber strength in wool and hair samples), and in terms of accelerated aging. Again, discolorations are to be expected. Again, ozone production is an additional factor.

d. Samples of interest because of their genetic information can be compromised, to an extent depending on the type of questions being addressed by the research in which they are to be used, because of large scale destruction of DNA molecules, accompanied by recombinations

e. Dyestuffs will fade, resulting in fading and color shifts in textiles, stained specimens, and color photographs. The same effect may result in shifts and fading of the natural colors of specimens.

f. Glass can undergo blue/purple discolorations; this may affect the research value of microscopic slide specimens. While this discoloration of the glass can be removed through annealing, this would not likely be a viable option for mounted specimens because of the effects of the heating on mounting medium and the specimens themselves.

g. Mineral specimens may develop colors and/or change colors; generally these effects are reversible through annealing, though of course the effects of that heating on the specimen depend on its nature.

h. In the case of specimens under alcohol, there is the potential for some radiolysis of the preservation solution, leading to the formation of various ions and free radicals in the solution. These reactions are very complex and can lead to a wide range of reaction products, but the concentrations of the latter should be in the ppm range and do not form a major concern. Additionally, the temperature rise resulting from thermalization of the electron beam energy would raise the pressure in the container somewhat, but this effect is not likely to be of sufficient magnitude to cause failures of the containers unless the integrity of the latter were already seriously compromised.

i. Rubber and plastic stoppers of bottles and vials may become somewhat embrittled, but not to an extent of losing the closure of the containers.

j. Magnetic media (floppy disks, zip disks, audio and video tape) will probably lose significant information content. Undeveloped photographic film will be exposed.

k. Generation of radioactivity in the irradiated samples is, under the proposed conditions, not a concern. It is not practical to try to mitigate the radiation effects through shielding of the samples, e.g. with lead metal. The weight of the shielding required to stop these high energy electrons would be quite high and make the mailing expensive;moreover, the bremsstrahlung generated by interaction of the electrons with the high Z elements of the shielding could still result in appreciable doses to be administered to the material inside. USPS also might have great objections, not only since it presents an attempt to circumvent their preventive actions, but also since this bremsstrahlung could conceivably create other problems at the irradiation facility.

In view of the above, it is strongly suggested that mailing through USPS of vulnerable specimens and collection items, as well as important research information on magnetic media or undeveloped film, be avoided unless it can be arranged for these mailings to be exempted from irradiation.

30152.

Recent examination of some irradiated mail

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The response of the Post Office to the anthrax problem has been the electron irradiation of select portions of the mail. The mail is packaged in sealed plastic to a thickness of over 3 inches and irradiated in two passes. Sufficient examples of the irradiated mail have been examined to permit some observations.

The irradiated mail exhibits definite yellowing, and this has been quantified by L*a*b* measurements of irradiated

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material. The color shift is not necessarily immediate and can occur over time. According to postal sources, temperatures of the irradiated materials can reach 130 C. High temperatures have been confirmed, for example, by the extreme distortion of polystyrene slide mounts. The softening temperature of polystyrene is about 110 C. The clear windows of some envelopes are polystyrene and these too have been found to exhibited softening and distortion, in some cases adhering to the printed matter beneath. Certain printed materials have become stuck together, probably due to the softening of the resins in the printing inks or photocopying toner.

Tensile measurements on irradiated paper show that there is a substantial loss in the ability of the paper to be deformed. This loss of extensibility has been as high as 80% and the resulting brittleness is severe. At this point the paper will not sustain being folded over. Analyses of the soluble material in irradiated and unirradiated samples of the same paper show an increase in the amounts of degradation products. The distribution of products is very different from that seen in naturally aged materials. The amount of glucose, especially, is not greatly increased. This shows that the damage is due to reactions other than hydrolysis, which is the primary reaction during the natural aging of cellulose. The relatively small amounts of soluble degradation products probably do not account for the large loss of strength observed, indicating that the changes are most likely due to radiation induced crosslinking. Such reactions have serious implications for the effects of irradiation on biological specimens. For example, crosslinking would severely hinder any DNA analyses.

Campbell Center for Historic Preservation Studies: 2002 Courses

The Campbell Center for Historic Preservation Studies is pleased to announce that the 2002 Preliminary Course Announcement is available on its web site http://campbellcenter.org/courses/prelim.shtml. 2002 Course Catalogues will be available soon and will be posted to http://campbellcenter.org. Collections care core curricula are available in three areas: Historic; Archaeological and Ethnographic; and Natural History. Other courses focus on Historic Preservation and refresher courses for practicing conservators.

Located in Mt. Carroll, Illinois, the Campbell Center for Historic Preservation Studies offers continuing education to meet the training needs of individuals who work to preserve historic landscapes and cultural, historic, and artistic properties. Workshops and courses last from two days to two weeks. Students are housed in dormitories on the campus of the former Shimer College, a group of 14 structures listed on the National Register of Historic Places. Mt. Carroll is in the Northwest corner of Illinois, about 2 ½ hours from Chicago.

Moving Collections: A Request for Information from the Natural History Museum of Los Angeles County

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Last June, at the SPNHC conference at the California Academy in San Francisco, there was an open discussion on moving collections. When the participants were asked "how many of you are currently involved in a collection move, have recently moved your collection, or are planning on moving your collection in the near future?" almost everyone raised their hand. It seems as if institutions everywhere are in the process of renovating current facilities, building new facilities, or a combination of both. And almost any of these building changes involve some type of collection move.

When I started as Chief Registrar at the Natural History Museum of Los Angeles County, there was some talk about a collection move in conjunction with renovation of our current facility, along with possible building additions. I had acted as a Project Manager on a small collection move, of 20,000 objects, in my previous position. That small move seemed like a huge task at the time, requiring at least two years to accomplish, including inventory, packing and re-housing of objects and artifacts. Now we are talking about moving collections of approximately 33 million objects and specimens!

In trying to plan and budget for such a tremendous task such as the Natural History Museum's collection move, we determined that it would be wise to talk to other institutions with similar experiences. Even though every collection move is unique, with its own set of complicated issues, we can all learn from each other's accomplishments, as well as our mistakes. Comparative information is especially helpful for budgeting purposes and in trying to convince people of the real costs associated with handling, packing, and moving collections in a safe and timely manner.

We developed a questionnaire to interview other institutions and gather this comparative information. Almost all institutions that I have interviewed so far have moved their collections from older mostly inadequate storage facilities to newer storage units, and in many cases completely new buildings. One of the good things to come out of many collection moves, is the chance to clean up, re-organize and of course, improve storage methods. I was hoping to be able to publish the results of these interviews, but since we are still in the process of gathering information, this will have to wait until sometime in the future. Since it would be beneficial to continue to receive information from other institutions, it would be great to hear from any and all of you. I have included the questionnaire for those interested in responding, or for those of you who would like to use such a questionnaire for your own collection move.

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INSIDE...

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What Do You Know About Butterflies? The Role of Object Conservators in Mounting a Living Butterfly Exhibition.

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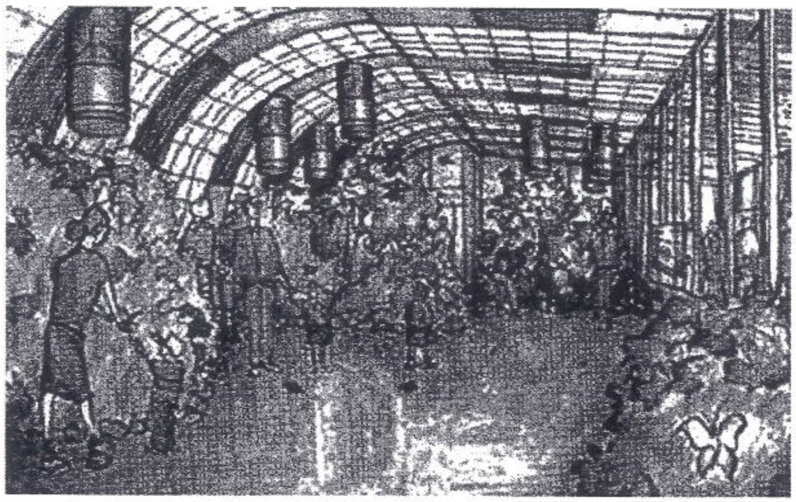

Artist's impression of interior of AMNH butterfly display

In October of 1998, I had the opportunity to bridge the gap between conservator and conservationist when I found myself working on the preparation of a living tropical butterfly exhibition at the American Museum of Natural History in New York. The goal of this paper is to describe the challenges faced in installing the conservatory, which I hope will be useful for those thinking about planning a living exhibit at their institution. The emphasis of this article will not be on the specialized needs of butterflies but on the contributions of some of the people in the project team, focusing on the role of the museum's conservation lab.

In 1997 two institutions, the Milwaukee Public Museum and the Academy of Natural Sciences in Philadelphia, offered AMNH the opportunity to host their exhibitions of living butterflies. After assessing the costs involved in modifying one of the traveling exhibits for the available gallery space, senior museum officials decided that it would be more cost effective to develop a similar exhibit in-house.

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Heritage Health Index Developing Nationwide Survey

Experts across the USA are participating in the Heritage Health Index, a major initiative to measure the condition and needs of the nation's collections. Heritage Preservation is coordinating the Heritage Health Index in partnership with the Institute of Museum and Library Services and with funding from the Getty Grant Program.

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