while referencing the Vietnam Memorial (a deconstructionist statement), the Olympics (an abstraction with political consequences), and Judy Garlands slippers from the Wizard of Oz (concrete objects related to a myth represented in movies). All these and other cases she saw as instances of connections made about people as individuals. The challenges she saw were buying the necessary talent and understanding the technology and its implications.

In the end, what was the Conference. An event that tells more about the past of museums, I think, than of their future. The speakers suggested that the birthday party of a museum should connect it with its community, make its objects live for others, use the technology to interact. In the event, they organized a party for the professional elite. There was much talk of objects and stories but none were constructed. The community was not present nor reached. It is interesting to think what kind of event would have occurred if the speakers had been the planning committee - would they have taken the risks Bob Janes suggested and launch the story Bran Ferren imagineered?

## CNI/OCLC Workshop on Metadata for Networked Images

In the last issue of this journal I reported on the background to a meeting held in Dublin Ohio September 24-25 on metadata required for access to networked images. Over sixty invited participants struggled throughout the two day meeting to define both what metadata was required for images and how the metadata requirements fit into the previous work on (text) documents from the 1995 Dublin conference and the proposed Warwick framework for a metadata architecture. In the end the participants arrived at two conclusion which are not surprising in themselves, but which are very surprising outcomes for a group gathered to

define the difference between image and text requirements for metadata.

First, we concluded that the metadata about documents which are images is not very different from the metadata about documents which are texts (and quite helpfully established that there are non-document like objects, both textual databases and graphical ones, like GIS and image generation systems, to which the "document-like" metadata does not apply).

Second, and very gratifying to me personally, we established that the necessary metadata is congruent with the metadata required for evidence as described in the Reference Model for Business Acceptable Communications which resulted from research I conducted last year <www.lis.pitt.edu/~nhprc/meta96.html.>

I was also excited that the meeting adopted the "stages of the research process" approach to determining what metadata required in which packets that I had proposed as a method for parsing elements into packets. My notes indicate that the working meeting concluded that:

1. Discovery is the first stage in the research process, which we can provisionally describe as including: Discovery, Retrieval, Collation, Analysis, and Re-presentation
2. The requirements for each stage are distinct (though not yet well specified). Different metadata will be needed to satisfy the requirements of each stage so these ought to be the criteria by which contents of metadata packages are defined.
3. Descriptive metadata (that which documents the item-in-hand and the original-item of which is a representation) will be quite different for fixed/bounded/document-like objects and for dynamic or non-document-like objects.

4. Document-like objects include texts, images, movies, musical performances, speeches and other information objects which are characterized by being fixed (e.g., having identical content for each user). Non-document-like objects include such information as virtual experiences, databases (including ones that generate document-like outputs), business graphics, CAD/CAM or geographic information generated from database values, and interactives which might have different content for each user. In the context of image discovery, these sources do not "contain" images as much as they "generate" images. The images they generate may be described as fixed document-like objects, but the metadata required to describe them (the systems doing the generating) are distinct.

5. Common discovery requirements for document-like objects include the ability to search for items by:
   a) Identification metadata:

      The unique id, handle and/or persistent identifier of this item or collection.

   b) Instance or Fixation metadata:

      Who created this image or digital file and when, who published it/when?

   c) Source image metadata:

      Who created the original content, when was the image captured?

   d) Content metadata:

      What, when and where does the image depict? (pre-iconographic description). Some content metadata may be calculated automatically.

   e) Subject metadata:

      What is the subject matter of the image? What is its genre and object-type?

f) Context metadata:

Why were these images created, in what business process and by whom?

g) Structure metadata:

What is the file structure, encoding, compression and format?

h) Relationships metadata:

If more than one item, how are they related to each other. For any single item, what are its relationships to other data (including non-image data)? How are the described objects related to intellectual schema's of the user's discipline?

i) Terms & Conditions metadata:

Are there restrictions on access and use? [To answer definitively, the system may need to acquire data about the user or proposed uses]

j) Use history metadata:

Where has this item been previously published, referenced, used?

6. The discovery process returns retrieval metadata packages:

Location/ Identification metadata: (handle)

Terms & Conditions Metadata: Access/Use resolver requirements

Structure metadata: Physical (File) documentation & software/hardware dependencies

7 Retrieval returns collation/analysis/representation metadata packages:

Context metadata: Full provenance schemas

Content metadata: discipline specific schemas

Structure metadata: data specific local storage schemas being supplied

Terms & Conditions Execution metadata (redaction reporting)

8. Collation, Analysis and Representation return use history metadata package:

9. Some uses, typically including publication and redacted release, would typically be reported to the use history metadata. (Use history metadata is generated according to the business rules of organizations making or documenting these uses and differ in different business environments. Libraries often record none, special libraries often record publication history, archives often record publication and research use history, medical records centers usually log all uses.)

At the conclusion of the meeting, I presented what I felt was a useful way of looking at the metadata and stages and preparing ourselves for a way to think about the architecture of a system that would support this process. Some work is going ahead along these lines.

## Metadata Packets and Research Stages

Possible Metadata Elements in each stage as contributed by each packet:

| | | | | | |
|---|---|---|---|---|---|
| **Description** | | | | | |
| Instance | Publisher Name /Publication place & date | Order number | Ordinals of relationships | | |
| Source | Creator, Date of creation, object-type, title, genre | | | | |
| Content | Coverage Date/ Location, Color | Arrangement ; file schema's | Data Content Dictionary | Data Values Dictionary | Conventions of representation |
| Subject | Topic/theme | | | | |
| **Context** | Functional Provenance | Agents & Roles | Rules | Value Tables & Organizational Schemes | |
| **Terms& Conditions** | Access and Use Resolvers | Agreed terms/ proposed uses | Acknowledgement | Anonymization requirements | Credit line |
| **Structure** | File type; Size, format | Resolution, Compression method, Dependencies | | | |
| **Relationships** | Item/Collection/Site | Disciplinary schema/ class | | | |
| **Use History** | Publication/ release citation | Captions, citation details | | | |

The final report of the Dublin Image Metadata Workshop has not been released yet. When it is completed, it will doubtless be published widely. I think the process stands a very good chance

of influencing Internet metadata practices and should be followed carefully by those in the cultural heritage arena. A few points made at the meeting should be kept in mind in assessing these and other metadata solutions because to make a system that will come as close as possible to consistently and comprehensively identifying sources on the Internet will require us to adopt some common ground rules.

- The target objects must include objects which are not in digital format but for which metadata is available in digital format (eg. the Workshop n Metadata for Networked Images became the Workshop on Networked Metadata for Images)
- The target objects must be largely self-describing if they are in digital format on the network (and they can be because much of their data is metadata for discovery)
- Conventions in broad use for documenting original objects should be extended to citations of those objects as the sources for digital objects (and applied by documentalists already in the library cataloging tradition)
- The system must accommodate metadata made by a variety of agents, for different reasons, at different times in the life of the object (and the model for this should support orthogonal metadata, perhaps with registered objects and data sets, although practice mat see overlaps).
- To be used effectively elements of metadata must be readily available as required by each stage in the research process in which the user is engaged (though different implementations might deliver some metadata at stages prior to its being needed).
- The user needs to know the elements of metadata (or at least categories) available but should be shielded from implementation protocols