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Situated Knowledge and the Virtual Science and Industry Museum: Problems in the Social-Technical Interface *

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Abstract. The Museum is a perspicuous site for analysing the complex interplay between social, organisational, cultural and political factors which have relevance to the design and use of 'virtual' technologies. Specifically, the introduction of virtual technologies in museums runs up against the issue of the situated character of information use. Across a number of disciplines (anthropology, sociology, psychology, cognitive science) there is growing recognition of the 'situatedness' of knowledge and its importance for the design and use of technology. This awareness is fostered by the fact that technological developments are often associated with disappointing gains for users. The effective use of technology relies on the degree to which it can be embedded in or congruent with the 'local' practices of museum users. Drawing upon field research in two museums of science and technology, both of which are in the process of introducing virtual technologies and exploring the possibilities of on-line access, findings are presented which suggest that the success of such developments will depend on the extent to which they are informed by detailed understanding of practice-practices that are essentially socially constituted in the activities of museum visitors and the daily work of museum professionals.

Key words: virtual museum, user/visitor, technology, WWW (World Wide Web) CSCW (Computer Supported Cooperative Work), HCI (Human Computer Interaction) Internet, ICT (Information and Communication Technology) culture, sociology, ethnomethodology, situated knowledge, local practices, classification

1. Introduction

The New Museology recommends that the study of museums and professional work within museums should adopt a greater degree of self awareness, inquiring not just into methods, but into purpose, context and consequence of practices. When Peter Vergo coined the term *The New Museology* in 1989, most museum workers were unaware of the potential and problems generated by Information and Communication Technology. Museums are no longer, if ever they were, innocent

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bodies engaged in the collection, conservation, classification and display of objects. On the contrary, today's museum practitioners are keenly aware that they are one among many components in a panoply of cultural amenities. Factor in the increasing use of technology, the influences that include the pressures from political and market forces, together with an increasing internal reflexivity and the result is a profession no longer intellectually isolated from a commercial array of cultural and leisure sites[2] and an institution no longer certain of its role or identity in the explosion of contested identities, image and meaning (MacDonald and Silverstone, 1990).

While academic attention has begun to be focused upon the issues identified above, thus far such study has, in the main, formed part of a programme concerned with providing sociologically oriented theories of the nature of 'museum culture'. We argue that, characteristically such perspectives or the work done in museums are a gloss on an elaborate set of practices. Our study is predicated upon the assumption that the possibilities of the 'virtual' museum will not be successfully realised without a nuanced understanding of 'actual' activities as *practical and socially organised* activities. It is also assumed that adequate understanding of the requirements of the various stakeholders in the social world of the museum must begin from an appreciation of the *situated* character of such requirements. What we aim to provide is a representational account, not charted on organisational schema, but rather based on how museum workers in a given setting 'get their business done', which is shaped around explicit recognition that their activities are 'highly situationally determined' (Douglas, 1971).

2. Background

In many cases the future of museums will increasingly rely on their position as resource providers and mediators within various educational infrastructures, including the World Wide Web. However pedagogists within museums have by definition always identified their function as being part of a local educational landscape. In the UK, national science museums have a long didactic tradition, providing educational and informational resources for diverse social constituencies. It is, however, only quite recently that funding bodies[3] have become keenly aware of the putative benefits that new technologies might confer upon museum work. Many museums are now beginning to utilise more recent information technology applications, intra- and inter-organisationally, to develop electronic databases and support curatorial and management networks. 'Designed in' telematics and interactive exhibits are now commonplace and extensively incorporated into galleries in order to enhance the user/visitor's experience. Multimedia applications are also widely used as a novel way of representing illustrated versions of texts

[2] At the Euro '96 Football Tournament the Microsoft Web page was registering around 9 million hits per week. An alternative Web site provided by Manchester City Council was still registering around 9k hits per week two months after the competition.

[3] See, *A Common Wealth: Museums and Learning in the UK* (London: Dept. of Heritage, 1997).

and artefacts. Images, sound and text are now becoming available and accessible asychronously through on-line local and global communication networks. Theoretically, these information highways not only extend and increase the available range and types of collections but also enhance the visitor/user demographic.

So far,[4] this process has been piecemeal and ad hoc in character and, while museums are keen to adopt new technologies, not for the first time can two key phenomena be observed. First, there is arguably a tendency towards a 'technology led' approach whereby the mere existence of new technologies is deemed to constitute a solution to organisational problems. Secondly, the rapid and enthusiastic development of new applications is not always accompanied by rigorous systematic consideration of the use to which they will be put. The need for strategic thought is now being recognised under the heading 'The Museum and the Web'. The appeal of such a slogan is that it can be used to mean many things to many people. This slogan does, however, signify a shared sense that communications technology has the potential to fundamentally reshape the very conception of what a museum can be. On-line technologies are emerging which, theoretically at least, have massive implications across the entire range of museum work and promise to revolutionise the activities involved in collections management and user access and enquiry. Allowing for the associated element of 'hype' which one has come to expect in relation to such claims (Hemmings et al., 1996) and the inevitable 'churn factor', there can be little doubt that elaborating the 'virtual museum' generates a set of issues which museum professionals and academics recognise as critical for the future of the museum as a civic institution. We moot these issues not to question the value of this technology but to focus attention on tensions in areas where our colleagues at the National Railway Museum and the Museum of Science and Industry in Manchester were concerned. The problems and promises were held variously to include: the enduring problem of storage and display space and the potential to transcend the physical location of the built environment; the issue of static classification and displays, as new or alternative representations of objects, ideas and narratives become available; and the growing sense of the educative function of the museum juxtaposed with the commercial pressure of increasing individual market share.

[4] With the possible exception of a limited number of European initiatives such as the International Museums Information Network (IMIN) and Remote Access to Museum Archives (RAMA), Race 2041 aims to make consultation and dialogue amongst museum databases possible. These data bases exist at institutions but have different internal structures e.g., ORACLE, INGRES, BASIC+, TINMAM, DIABOLA, etc. and different vendors such as IBM, HP and Sun. CIMI, the Consortium for the computer Interchange of Musuem information <www.cimi.org> is actively exploring standards for the interchange of museum information. The current EU museum project, Aquarelle <aqua.inria.fr/EN/home-eng.html> is also building inter-institutional networks to support museum professionals.

3. Curatorial Work

Our study covers a range of practical issues, including the work of curators and archivists, designers, marketing personnel, 'educators', management, and intra- and inter- museum relations. Some, but not all, of the work we observed was germane to the use of technology. We concentrate in this paper on classification work and how it is done by curators and archivists, largely because it relates very much to potentials and problems of recording and using database information; because the use of database applications is more advanced within museums than any other kind of application; and because curatorial practices enable us to make classification visible as work. As an initial point, classification work can be recognised as cooperative work, rather than simply the individual expert's deployment of pre-existing categories in stable hierarchies. What we try to do below is present an account of the kinds of relevant practice that need to be understood as classification work before we can begin the process of identifying what is 'appropriate' computer support.

Curatorial work[5] is of special significance in relation to computer technology since collections management relates very much to issues of recording and using database information. It is not surprising, therefore, that the use of database applications is more advanced in museums than any other kind of application. It is also notable that this work is co-operative, in the sense in which that term is understood in the field of CSCW (Computer Supported Cooperative Work). The museum 'collection' constitutes the central reality and rationale of curatorial work. In their daily activities, curators work with 'the collection' in myriad, socially shared and socially legitimated ways. The work done includes such activities as accessioning, whereby objects come to be included in collections, and classified as being of a 'kind' within the collection; work involved in identifying and documenting a collection's items, including the hidden collection of objects, artefacts and texts not on display; and the work of display/exhibition making.

Again, it should be acknowledged that this work is often taking place in a changing organisational context. Our studies thus far have revealed a tension between, on the one hand, an intellectual climate in contemporary museum life which problematises 'meaning' and, on the other, a 'rationalising' tendency which seeks to stabilise or fix it for organisational purposes. As we have outlined, the changing status of the museum, and accounts of its 'proper' purpose, along with the pull of the commercial nexus, have substantially affected the professional curator's sense of the curatorial function of the museum (Kopytoff, 1986). In other words, curators perceive a requirement to be responsive to competing views concerning the meaning and organisation of knowledge. The characterisation of curatorial work as interpretational work involves acknowledgement of this requirement. Such

[5] By *curatorial work* we mean the work of those whose activities include planning, designing, constructing, collecting, and organising museum collections and exhibits.

concerns open up a difficult analytic terrain regarding how one might organise and classify artefacts and texts in more flexible ways.

4. Technology in Context

Across a number of social scientific disciplines (e.g., Anthropology, Psychology, Sociology, Cognitive Science), there is growing recognition of the situatedness of knowledge and of the importance this has for the design and use of technology (Suchman, 1987; Hughes et al., 1991). This awareness is fostered by a large and growing literature which documents the fact that technological developments are all too often associated with disappointing gains for users (Jirotka and Goguen, 1994). Consensus is emerging that the effective deployment of technology relies upon the degree to which it can be thoroughly embedded in its contexts of use, including the ordinary, practical orientations and competencies of those who are to work with it. The problem of understanding what computer systems are for *in socially situated terms*, rather than simply in terms of an a-social, technical perspective, is an enduring one, and must be addressed if such systems are to be woven into existing social practices and thus provide for the effective creation of new ways of working. Virtual technologies, whether or not they represent radical innovation, and regardless of their potential impact at a societal level, will be usable (or otherwise) according to criteria of relevance determined by situated use. Issues of relevance are at the heart of multi-user systems, and translate into specific concerns which have to do with the organisation and use of information. It is apparent that, in a context such as the museum, factors such as contested meaning on the part of the professional community, differing organisational roles, including those of educators, curators and managers, and the particular needs of different categories of visitor mean that information retrieval is very much a matter of relevance. Usable technologies should enable disparate users to interrogate information according to their needs and concerns, and thus should furnish the user with relevant search strategies for retrieving information according to what they require from it. In turn, information must be organised in such a way that varied strategies can be supported. In part, these strategies are informed by the *classification* devices used by information users. Artefacts and text considered as virtual information resources do not exist in an undifferentiated mass, to be searched and sorted more or less randomly, but as resources which are to be interrogated according to professional and lay categories-categories which will vary according to purpose.

5. Classification

Classification work, which can be defined as the ordering of things according to some scheme of categories, is central both to lay and professional use of museum information. Currently the new museology is not only concerned with the use of computer technology but also with the interrelated debate around the legitimacy

of 'grand narratives' of science and reason. MacDonald and Silverstone (1990: 176–7), argue that the changing nature of contemporary British society is reflected in the problems facing museums. They go on to argue that the symptoms of this shift can be identified in ". . . a fragmentation of taste and style; representation and classification have become unprecedently problematic". Interestingly for us, they also reflect upon "the changing and subjective nature of the principles on which museum objects are selected". Similarly, ethnomethodological studies emphasise the *practical and contingent* character of classification under real world conditions (Garfinkel, 1967). Our own stance on these methodological choices is ethnomethodologically informed and is intended to develop the literature on ethnography, particularly the description of the local, in situ organisation of activities. Such an approach has a number of advantages in this context of classification work. Firstly, emphasis on the 'situated nature' of work interactions gives an analytic purchase on the different ways in which actors can encounter the museum exhibit, locating their understandings of objects in their local and contextual purposes. Secondly, such studies have a strong and distinctive evaluative element, relocating evaluation strategies in the real world of work and organisational context. Thirdly, they can link with user participative methods, the ethnographer acting as a bridge between the communities involved and assisting in the articulation and representation of viewpoints (Twidale et al., 1994).

6. The Ethnography

Our analysis is based on an ongoing two year ethnographic study of the work of museum staff and visitors in two locations in the North of England; the Museum of Science and Industry in Manchester (MSIM) and the National Railway Museum in York (NRM), concerned in part with what might be called 'scoping' the problem of information use at the museums in question. That is, we have been mainly concerned with an attempt to understand what kind of work is undertaken, and by whom, and how this work might prove to be relevant to information needs. Our study continues and we have currently completed about a year of observation. Our reasons for focussing on the museums in question had to do with local accessibility and the existence of contacts who could facilitate entry.

We began to recognise early on that some features of museum work, for us at least, had been previously unconsidered. Firstly, each museum has its own biographical history. By way of example, the origin of the Manchester museum was as a small scale, almost personal enterprise prompted by the interests of an individual in the history of engineering. The museum at that time therefore was seen as 'his personal project' and the collection reflected the founder's interests. One of the fundamental functions of the museum then was perceived as educational, quite specifically as an 'aid to schooling'. It grew when the local city council offered a railway goods yard and all the artefacts it contained. The museum then became situated historically at the location of the world's first railway station, and

this informed the formation of a set of embedded assumptions about 'what was important'. The original source of funding was the local council, and this in turn influenced policy – a policy that was essentially parochial and very much to do with what was perceived as 'locally relevant' – especially since the 'Manchester' connection determined things like funding support for acquisition. In a nutshell, the museum was run by enthusiastic amateurs for whom the evolution of policy was a question of deciding what it was that they were enthusiastic about. Policy was, of course, progressive, and management and curatorship increasingly professional. Nevertheless, this brief history indicates the way in which we want to understand the contingent nature of policy criteria concerning relevant acquisitions and display decisions – as being in part arrived at in the 'doing' of decisions concerning 'what do we want' and 'what don't we want?' and also partly in the acquisition of objects by 'chance salvagings and donations' (MacDonald and Silverstone, 1996).

Folklore would have it that we might assume that curatorial functions were akin to detective work; happening on clues to the whereabouts of rare and valuable items, and tracking them down. The reality here was startlingly different. The most surprising aspect, for us, was the fact that both museums are confronted with an almost endless supply of artefacts and materials. Their problem is less to do with how to find exhibits, but with how to decide what to reject and what to keep, and the latter greatly exceeds the former. The museums are engaged in sorting work, manifested above all in 'accessioning' and 'de-accessioning', or deciding what should constitute the 'collection'. To an extent, an 'embarrassment de richesse' affects acquisition strategies, and available space has a significant impact on what can be kept and what cannot.

7. The 'Local' Production of Order

Our interest in the way in which objects are specified as being 'of a certain kind' relies on uncovering the knowledge and experience which informs the practical, day-to-day, work of curators and others. For example, one way in which this work is made visible is when considering acquisitions and their cataloguing. Unsurprisingly, museums need to do this. Institutions of this kind after all would find it difficult to operate without recorded knowledge of the objects they own or control. Nevertheless, it is more than simply making a list of objects and appropriate terms. The inscriptions which are generated, be it in the catalogues, the cards accompanying displays, or the fields in databases they use, indicate not just the name of the object representative of its class but also provide an expert author-ised version of its status. That is, the act of examining and inscribing the object's status is an attribution of 'value'. They are examples of what Berger and Luckmann term 'typifications' (Berger and Luckmann, 1961), but typified according to relevancy criteria determined by expert judgment and agreement. Deciding 'what kind of object it is', then, is a matter of providing a description which incorporates judgements

that come under headings that may include ‘provenance’, ‘uniqueness’, ‘rarity’, ‘representativeness’ and ‘thematic relevance’ to the ‘collection’.

In both the museums we are examining, objects arrive and leave in a more or less continuous stream as candidates for inclusion. To reiterate the point, artefacts come to the museum without an ‘authority’. They are merely candidates for inclusion, and their inclusion confers an authority upon them. In other words, authenticity is granted them by virtue of inclusion, and they stand as ‘authentic’ to the visitor as a result. Procedures for ‘theming’ exhibits within the museum, for deciding what to display and where, for cataloguing the collection and so on, are linked to these locally relevant classification schema. Classification, however, is an increasingly problematic area. In this respect, the developing interest in the relationship between image and text (Burgin, 1986a, 1986b) is relevant. Whilst not wishing to engage with the explicitly political rendering of meaning that Burgin and others are concerned with, it is clear that serious issues concerning the classification and ‘meaning’ of artefacts are raised. Providing ‘coherent’ and ‘relevant’ themes is often more a matter of organising artefacts and text, not merely representing them.

The limitations of physical spaces mean that, often, only highly constrained choices are available. An initial example concerns a large Goss printing machine currently in the possession of the Manchester museum. We were present at discussions concerning whether this machine should be de-accessioned, which in effect means finding another institution that might be interested in it, or otherwise scrapping it. What is interesting here is not the machinery, but the rationale that was brought to the discussion, which included a discussion of ‘provenance’, a term covering the history of the machine, the site it came from, the local relevance of both the site and the machine itself, the importance of the printing industry to the local area, where it was made and so on. Points at issue included that the machine itself was not made in Manchester, but was a major technological development in the development of the printing trade in Manchester, that chronicling the history of printing necessitated the ownership of key machines, but that printing was ‘no longer that important’ locally. The point here is not that these factors are the most important in determining the factualness of an artefact, but that they were the most important governing the fate of this artefact. That is, an account is provided which has to do with changing assumptions about its value. This whole discussion takes place against another background, that of available space. The fact of the matter is that printing machines are very substantial, and retaining it weighs against the acquisition of other things. In a nutshell, objects have careers. Hence: database management in museums will involve careful control over the recording of both what enters and what leaves the museum, and the collection changes in a more or less continuous way.

Needless to say, not all artefacts are large objects. Many are flat and contain image and/or text, are paper based and often come bundled. The result is that this ‘raw’ material has to be searched, sorted and identified in order to establish, by inspection, their relevance to ‘the collection’. By examining two bunches of arte-

facts arriving at MSIM, archives from large electronics manufacturing companies based locally, we can identify the situated and contingent nature of curatorial practices. In the first instance, a large collection of text based materials was accepted from a company which had been based in Oldham, a town near to, but not part of, Manchester. Subsequently, a larger archive, which included photographs and detailed historical records, was offered from an important local company based in Trafford Park, a region of Manchester.

Of course, such materials do not arrive prepared and ordered for museum use. The curators, in their own words, must 'do a job on it'. Watching them examine the material, it is clear that the physical nature of the artefacts in question provides a variety of accessing routines. Some of the material is flat, some of it consists of photographs of buildings, machinery and people, some of it is large format paper, and thus can be unfolded, as with blueprints, etc. Some of it is sequentially ordered that could indicate the recording of a product in development. The practised eye of the curator can 'see' how this material could be potentially re-organised as a display item or as a 'fileable' resource. As the material is accessioned, knowledge is applied to it. Consider the following transcript:

> 'oh, this would do for . . . look, photos of Trafford Park . . . you can see the development . . . ' 'GEC is a big international company, but its got a local history. I mean, GEC is Trafford Park, and Trafford Park was once the world's biggest industrial centre . . . ' 'the [other] archive is just not so interesting . . . '

As they are unpacked, the materials are 'seen' as what they might be. Drawing on the kinds of relevancy we mention above, the archivist is able to tease out the social, political and economic relevance of the material, and thus how it might be ordered for the visitor or the professional interrogator of such material, in and through the sorting that is going on. The 'interpretation work' that is taking place is 'doing' work. It is the physical work of separating material into piles, noting that some parts of it have a particular relevance, some could be incorporated into other displays, some have 'exhibition' potential, and so on. Notably, the criteria being applied centre on the local relevance of the material, as in 'GEC is a big international company, but it's got a local history', and on the significance of the material, as with, 'oh look, photos . . . you can see the development . . . ' and 'Trafford Park was once the world's biggest industrial centre . . . '. In other words, the sorting and classifying of the material is done with an eye to the story that can be told, and a story which is in keeping with known-in-common criteria. Curators evidently 'know what they mean' when they use terms like, 'is an example of ', 'is typical of ', 'is a rare example of ', 'is of the school of ', is 'the first' or 'last example of ' or is 'a common type of ' and such terminologies are reflexively deployed against, in this instance, background assumptions concerning the museum's interest in 'local' matters and in 'industry', as well as 'what we can do with it'. All of these usages, despite their sometimes contradictory status, might at some time be used as justifications for retaining or acquiring a particular piece. The objects present themselves as

candidates for inclusion and are sorted on the basis of what 'is interesting' about them. What is interesting is determined not only by assumptions about the object itself, but by the determination of the curator's practised eye deciding on its 'place' in the collection, a place which is determined by the status of all the other objects in the collection and the curator's knowledge of their relationships.

For MSIM in particular, the judgments arrived at are dependent on criteria such as whether it has local relevance, whether it has significance for the subject area of the museum, whether it is unique, and the object's provenance. These matters, it turns out, are important not only for accessioning but also for de-accessioning. Museums of this kind have an endlessly changing set of potential exhibits and frequently wish to move objects elsewhere, or simply dump them. The point here is that the Accessions catalogue constitutes a brief record of the rationale for accepting objects or disposing of them. Not least, it seemed the entering of a description in the catalogue gave a status to the object, a status that is arrived at by discussion and subsequent agreement among participants. In other words, the work of cataloguing is the work of defining objects as being 'of value' for specified reasons. What is being recorded, so to speak, are curatorial agreements concerning the 'value' of potential exhibits. A more complete picture of the things that decide 'object value' in this work would, we think, tell us much about appropriate categories for database organisation.

Based on this example, we can make a number of points about representing the status of objects. It is not a matter of imposing a rigid classification scheme, but of using existing classifications for deciding 'what you can do with it' and it is in this way the we can begin to see knowledge work as situated action, in that classifications deployed are not simply descriptions of the objects themselves, but emanate from 'seeing' the material as it might be as part of a gallery, of an existing or potential exhibition or as a resource for scholars. That is, classifications incorporate assumptions about the 'value' of objects. Classification schema are contingent upon relevancy criteria which are not self-evident, but have to do with evolved policy concerning the museum's 'interests'. They include, in addition to those aspects we mention above, their use when applying for budgets, determining levels of staffing, space to be allocated, etc. Classification is not fixed but is contingent on the practiced reading of acquisitions, and is remade reflexively as new acquisitions take their place in the collection.

8. Classification and the Working Division of Labour

As any practitioner will know, museum work is complex. Classifying work does not go on in any single place, or stage of an object's career, and is not solely the responsibility of the curator. Museums employ staff with various responsibilities, which might include, for instance, professional designers employed for exhibition purposes, educators delivering formal programs, as well as marketing and administration. In addition, professional staff frequently rely on networks of enthusiastic

amateurs for aspects of their work, as we shall see. On many occasions, these roles become rather fluid, and it is difficult in practice entirely to distinguish between what designers and educators do, and what curators do. There is no space here to detail all aspects of the work, so we content ourselves with referring briefly to two areas. We do so because in different ways they demonstrate the contingency of classification, according to the purposes at hand.

Analysis of artefacts and their allocation to suitable categories takes place when exhibitions are put together and when responding to inquiries. The 'in house' work of preparing for more permanent exhibition is considerable. Here, the work is that of selecting relevant exhibits, structuring them in an orderly and coherent way according to the 'story' they are trying to tell, and providing a narrative text. Again, the work of producing the story is invisible to the outsider and is produced out of discussion and agreement concerning the status of objects which an exhibition might contain, and how they relate to each other. However, these relations are contingent on the exhibition in question. Something is, one might say, deemed 'like this' for 'this purpose' although it might quite well be described in other ways for other purposes. Further, it is not as if the story to be told comes fully formed. The production of the exhibition is as much the production of a story as it is the production of an organised set of artefacts, and the communication of the manner in which they inform each other. The objects, the accompanying text, and the positioning of objects vis-à-vis others together tell the desired story.

Electronic catalogues of objects require organisation with exactly the same attention to what stories are to be told. Classification schema sometimes imply a concern for narrative and, in our view, inadequate attention has hitherto been paid to how various stories can be woven together, and more importantly what we wish them to be, or say, when electronic media are being used.

Other relevant classification and interpretation takes place in response to inquiries, typically by telephone or in person. Indeed, in the museums in question, this fact is recognised and institutionalised through rota systems for dealing with them. Although many of these enquiries were of a routine nature, some were not. There is, for instance, the occasional request from the media to provide information of a more in-depth kind than one would expect from a typical member of the public. Our point here is that answering enquiries can be far more than merely giving an answer to a self-evident question. Responding to an enquiry can be a process of identifying exactly what it is the enquiry is about, and can involve identifying, finding, and preparing, the 'local expert' to answer the enquiry in question. The social distribution of knowledge and expertise is a common feature of organisational life, and we have seen elsewhere (for instance in studies we have been involved with in the financial sector) that asking and answering questions, whether it be from customers or colleagues, is a frequent and surprisingly complex activity. The point here is that 'answering enquiries' sometimes involves making sense of 'what kind of enquiry it is', a task human beings are well suited to. 'Understanding the question' and 'finding the person who knows the answer' relies on 'what the

respondent knows' as part of his or her professional expertise. Embedding this expertise into systems intended to answer the questions visitors or staff may have is anything but a simple exercise. It relates directly to the problem of database interrogation and certainly involves more than the 'Frequently Asked Questions (FAQ)' framework commonly found on the Internet. Classification schema embedded in computer databases do not necessarily pay due regard to the fact that relevant classification is contingent upon the task in hand. Museum databases should be flexible enough for information to be retrievable in such a way that other roles are supported, not merely that of the curator.

9. Working with a Database System

Our argument, then, is that classification work involves the production of a 'sense of order' out of the myriad artefacts and texts available. Despite the recognition that historical interpretation is a contingent matter, there is not, and has not been to our knowledge, any serious suggestion that museums could get by without managing objects into 'orderly' collections. The 'sense of order', in other words must precede any subsequent disagreements about its partiality. We need to understand more fully how it is arrived at, if we are to successfully evaluate the possibility of developing standardised usages. The following sample situation took place over a period of time at the National Railway Museum, and involved the senior curator in the engineering department of the museum and a network of enthusiasts as they evolved a suitable classification scheme for a particular kind of railway truck. As background, for the visitor to the NRM, steam trains are redolent of many things. They evoke, for many, a 'romantic' past. Steam engines, it seems, are 'of interest', and the museum can trade on a number of assumptions about the public's enthusiasm for their history, including the apparent attraction of 'steam', and a general interest in science and engineering issues, and political and cultural background. Not least, steam engines have a large and impressive physical presence. Notably, however, this enthusiasm for the engine on the part of the public is not accompanied by any enthusiasm for the rolling stock. 'Wagons', as aficionados term them, have other characteristics, which seem to make them less interesting to the public. They are exceedingly common; they are not easily distinguished one from another by the unpracticed eye; and they are not 'nice to look at.' Nevertheless, for the railway expert there is a considerable interest in this kind of rolling stock. Historical developments meant that certain wagons were manufactured to do certain jobs in certain locations. For instance, wagons specifically designed to transport clay from Cornwall to centres of paper finishing in the North of England, were built as the rail network developed to allow for large scale transportation. A number of problems occurred, including the different sized gauges in use by private regional companies. Such matters, however obscure to the rest of us, are interesting to the curator.

In terms of classification, an operational scheme exists for identifying these wagons according to what is known as a TOPS number. Such a scheme, however,

is of no value to the curator since the scheme is operationally defined, meaning that it distinguishes only by criteria such as axle weight and payload. Operationally, TOPS allows one to determine whether one set of wagons could be connected to another, and what engine could tow it. Marshalling was dependent on this scheme. The TOPS number is of no value for curatorial purposes, precisely because the historical significance of the object is not equivalent to its operational significance. The object has changed.

At NRM, the group determined that the historical part played by the wagon in the development of the railway had been somewhat under-researched, had if you will something of a 'Cinderella' status, and set out to catalogue and classify all existing wagons of a particular kind. The classification issues in this type of research project turned out to be markedly different from those implicit in the operational scheme. New methods evolved as part and parcel of the work of recording the existence of rolling stock. It was decided that the network of enthusiasts would 'spot' these wagons in much the same way that trains are 'spotted', but that in so doing they would record certain relevant details, most notably where the wagon was to be located, the condition it was in, and so on. Each agreed that when embarking on this exercise they would photograph the artefact in question, and record the relevant details in notebooks. This candidate classification scheme based on 'provenance' (in museum usage), was organised in and through a small group's discussions of what needed to be recorded so that the recording could be done at all. It evolved through the 'taken for granted' background knowledge about typical classifiable characteristics of wagons that enthusiasts and curators share. As with all classifications, the terms used need to be consistently defined if they are to be useful for comparison work, so descriptors such as 'rotting', 'wheels on or off ', 'coal', 'clay', 'manufacturer', etc. were agreed on. In the first instance, some 'broad brush' classification enabled the work of 'collecting' data to take place. We might refer to these, in Berger and Luckmann's terms, as typifications, or as candidate classifications, in that they will 'do' for the purposes in hand. They are socially organised agreements, reached to enable the completion of a particular task.

As information began to amass, the problem became one of organising it into an orderly record. The brief details were, therefore, brought back and put into an A4 ring binder. Entries were placed in the binder chronologically. Using this binder all the time, and getting used to 'where things are' in the binder, allowed the group to do comparison work. For example, using the record as a pre-classified resource allowed members of the group to compare discoveries with existing finds, and thereby to generate their own knowledge of the 'state of play'. As the scale of their endeavours grew, however, it became evident that a more effective recording system was required, largely because the work itself had produced a greater sense of its importance. In the words of the senior curator, "it's important work . . . we can't keep all these wagons, and many of them are deteriorating . . . it's the only record we have of a part of Britain's industrial and transport history." It was thus

decided that the information be transferred to an electronic database, designed using software purchased 'off the shelf,' chosen for its customisability (called ACCESS). A set of criteria to describe each wagon were agreed: TOPS; geographical location; owner; date of manufacture; name of manufacturer; a photograph. In addition, a scale of 1 to 5 is used to record condition (status). These criteria became fields recorded in the ACCESS system. The condition scale, along with the other fields, was agreed beforehand on the grounds that it was a 'good' method. 'Good' here, consistent with Garfinkel's findings (op. cit.), meant simply that members arrived at agreements with a degree of consistency. A text box in the system also allowed the group to record notes about biography, special details, whether the wagon is rare or typical, is worth buying or not, etc. By recording the information both in the ring binder and in the database, it was then available for interrogation, and thus to interpretation. The curator was able to show us an example and say, 'this wagon is a fine example of a particular type of clay wagon . . . it was used in 1947, and played a particularly important part in the development of the paper finishing trade.' This ongoing work involves two distinct kinds of classification work. The first is what Coulter and Parsons (1990) refer to as taxonomic work, which involves laying down the terms by which artefacts can be organised in the first place. The second, however, lies in the special qualities of individual items or their 'uniqueness'.

Taxonomic work and 'uniqueness' work are distinguishable, and both need to be supported in museum databases. For the most part, the evolved system of coding and incorporating information into a small database worked well. Problems arose, however, as the network of people involved began to expand; we were able to observe first hand some of the consequences when being shown the system. The reliability of members' terms came into question, as the terminology used when new 'spots' were input into the database became increasingly variable. Particular confusions arose over the status of one variety of motorised wagon, termed a 'Mogo'. It seems there are a number of different kinds of Mogo, identified by weight (for instance the 8 and 12 ton versions). As the curator showed us how he used the system, he said,

> "I'll bring up Mogo, cos I know there are two of them. I can use search criteria like these . . . oh, there are five. Hang on, I'll try again. There you are, those two . . . I can't see why I got five the first time. It's to do with the order you search in, but I didn't know there were five of them."

Of course, problems of search ordering are well known, but that is not the point here. What had happened was that different people had made assumptions about the appropriate terminology to describe the 'Mogo' and reached different conclusions. Thus, 'spots' had been entered variously as '12 ton Mogo' or 'Mogo 12 ton'. Some entries of 'Mogo' had been capitalised, others entered in lower case. Members had taken for granted their knowledge of Mogos and assumed that the database was configured in that respect, whereas it had been configured according to the senior curator's categories alone.

There followed a lengthy and animated discussion – which we will call a 'what's in a name?' discussion – and which we need not relay in detail. Arguing about a naming, however, was indicative of the need to identify fields in such a way that they both incorporate and exclude in ways that are consistent with members' conceptual categories. This poses a potential problem for extending to new users, in that standardisation, however desirable, may require us to be sensitive to the changing user population, and variations in the 'common-sense' categories they deploy.

General conclusions we might reach from this example include:

– Classification schema evolve in the course of the job of work in hand. The 'value' of artefacts can be decided through the deployment of recorded data, but equally, determinations of value produce new versions of the classification scheme.
– The effectiveness of a classification scheme depends on the 'authority' of those involved in producing and applying it. Users have considerable difficulty in inputting and interrogating information where any number of potential descriptions could be appropriate, and where the user population evolves.

10. Conclusion

In a climate where museums are under an ever increasing commercial pressure, and where once secure roles are becoming challenged, the task is to understand how work practices relate to the general problem of ordering and classifying the myriad objects which museums keep in their collections (objects which can include artefacts, texts, images, and whole archives). We are attempting to examine and report on the situated nature of classification work in such a way that the next generation of systems might support work as it is practically accomplished; work that for the most part has remained 'seen but unnoticed'. Classification, when considered as a job of work, can be seen as oriented to, and contingent upon, a number of factors which have to do with the way objects and texts come to attention, by whom they are considered, the local relevancies of the museum, the research interests of curators, and the prospect and desirability of display. All of these factors may influence what classification is deemed appropriate, and lead to the conclusion that artefacts may in principle be classified in any number of ways.

The contingent status of artefacts, the invisibility of rationale, and the 'work done' by users, have direct corollaries in design terms. We have suggested a range of issues that seem germane to the general problem. These include the consideration that objects and collections have 'careers' and thus change; that classification emanates from an ability to 'see' objects, not just in terms of their value in the collection but also how they relate to local relevances. Perhaps more importantly, our analysis is based on the understanding that curatorial and in particular classification work is, to paraphrase Coulter, predicated firstly on the practical mastery of a vernacularly conceptualised knowledge domain. Secondly, mastering a concept

is not simply the ability to rehearse lists of information putatively related to objects, it is rather the attainment of a number of abilities, primarily the ability to use the relevant vocabulary on the appropriate occasion to express the concept in question. Thirdly, mastery of these abilities can be *graded*: for instance, I may know how to tell the difference between a coal wagon and a passenger wagon, but I cannot tell the difference between a coal wagon and a clay wagon. Similarly, a train driver may recognise a coal wagon and be aware of its shunting restrictions, without knowing its cubic capacity or its date of manufacture.

Understanding museum work, then, means seeing it as having a historical character, reflecting the sedimentation of things that have happened, chronicles of events and significant developments, and of the changing roles and consequences of artefacts. It is constituted, in short, as the 'ordering' of history. In the sociology of museums this has been much remarked upon, generally in terms of the way the order of things, using Foucault's formulation, is an ideological or discursive construct (see Bennett, 1995; Macdonald and Fyfe, 1996). These are spaces which have been opened up in the 'post-modern' era for contestation, for instance by feminist scholars (see Porter, 1996). Thus, competing views of history are said to inform or influence the work of curators to a greater degree than ever before, along with the recognition that their interpretive work is at best 'partial' and incomplete.

Our interest lies in the way in which the coherence of classificatory schema is arrived at and maintained, and one of the most striking features of this work is that agreements about the conceptual level of taxonomy need to be reached before there can be any disagreements about classification and significance. Like Coulter (1990: 255) we do not wish to argue that there is a "*pristine* (perhaps physiological or for that matter psychological) cognitive 'level' of 'perception' over which is imposed a separate order". Rather we prefer the notion of 'concept-*boundedness*'. Even so, classification is partly the work of making a history coherent, of arriving at definitions that are suggestive of the ways things can be made to relate 'in theory'. Relevancy decisions are made precisely with an eye to the way things 'fit' and using those definitions as 'working hypotheses' or resources for further coherency work. Categorisation devices are the rationale by which curators arrive at mutual understandings of what it is that they are doing. Such a description may make it appear that inscribing terms and usages in databases will be no more complex than for any other set of terms, and so it would be if the coherence we refer to led to a single usable hierarchy of terms; if usage could be made 'planful' such that all new objects and texts could be made to fit an existing thesaurus unproblematically. The problem is precisely that this cannot easily be done.

The comprehensive electronic organisation of on-line data about museum objects would be greatly enhanced by the prospect of a variety of parallel classification schema, search pathways, and sophisticated database interrogation techniques which would allow the parallel and multiple uses we have outlined above. Attaining these goals requires a sociological input into system design. The reader will not be surprised to hear that we proffer no solutions. Our inquiries raise initial questions

concerning how working with database systems might allow, rather than obstruct, contingent classification. The first task, as we construe it, is to do the ethnographic work, evaluate the situated nature of museum work both in the use of technology and without it, and understand how in practice classification work is done.

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