

Materials Resources for Art, Design and Business

MADE Forum at the Royal College of Art, London, 5 February 2010

Report by Hugh Aldersey-Williams



Libraries have had well over 2,000 years to get it right. Ever since the great library at Alexandria became famous during the reign of Ptolemy, the idea of a permanent collection of written learning has been central to our civilisation. The rules of the library are well established: books may be consulted, sometimes borrowed, but stay in the possession of the library; they may be loaned between individual libraries within a network; new books are acquired and those judged obsolete sometimes quietly sold off. Libraries may be general, or they may be specialist, but either way there is a tacit understanding that they do not compete against one another. More often, they cooperate in networks so as to give the greatest number access to the greatest range of books.

The question for this MADE forum was whether libraries of materials are similar to collections of books, and if so whether conventional libraries offer a model that might be emulated. If not, what sort of resource would help improve access to materials and process know-how? At the moment, there is a relatively small – although growing – number of materials collections scattered mainly among

various academic institutions (a list of some of those recommended by forum attendees is given at the end of the report). These have been built up at various times as educational resources, but are seldom kept up-to-date, often poorly promoted and little used except by those in the know. How can they be made more effective? Although all are relatively incomplete, they do little to coordinate their collections and activities. Nor, unlike book libraries, is there any agreed approach to organising and cataloguing the materials they hold.

Materials are very different from books in at least one crucial respect. Books contain the knowledge that their writers desire to pass on. They tell their own stories. Materials for the most part don't. Materials samples can be informative in some ways – the visitor can make an immediate aesthetic assessment and get an intuitive sense of some important physical properties, for example. But the hinterland of the material itself is usually missing in these collections. An inert specimen can't begin to convey the essential lore that goes with that material – the history of its development, the comparison with the



inferior or unsuitable materials it was designed to replace, its successes and failures in application, the little tricks of the trade needed if one is to work with it successfully, and so on.

All this information lies with people; it is not in the material itself. This material – satin, copper, oak, biocompatible ceramic, whatever it may be – has behind it a body of expertise that has built up through the years or centuries of its development and usage, and this is where the real knowledge lies. Clare Johnston, Professor of Textiles at the RCA, introduced the MADE Forum by outlining her own experience of finding out about materials, which involves regular visits to the trade fairs, on the lookout both for what is outright new and for the novel twists that will update her knowledge of what is possible with established materials. ‘The longer you do it for, the more you know,’ she said. This learning is internalised and becomes part of one’s personal skill, and is expressed in the uniqueness of one’s output. These creative products may say something about the materials of which they are made, but not everything that another person might need to know before using the same material for themselves in another way. That remains in the creator’s head. ‘And in the end all your knowledge is lost.’

WHAT IMPACT WILL
RAPID PROTOTYPING HAVE
ON EMERGING DESIGNERS
KNOWLEDGE & APPLICATION
OF MATERIALITY?

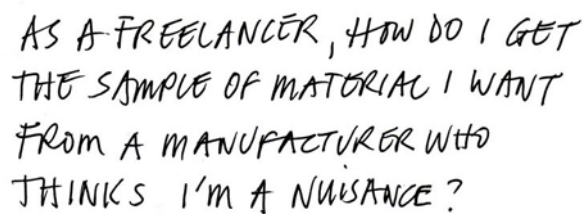
How to capture this material knowledge and pass it on to others is the question. Oral history based on direct experience of putting a material to various uses seems in many cases to be more useful than a specimen of the material itself, especially when published information about the material is often inapplicable or even unreliable, but this is seldom recorded. Anecdotal evidence of visitors to the Materials KTN design exchange resource suggests that while people find the samples displayed there helpful in themselves, they often feel the necessity to take it further and talk with a person who has used the material in an application like the one they are considering.

Stainless steel is difficult/expensive/resource intensive yet used in some seat design. Can a more sustainable material be found to replace this - laminated? ceramic? Where would one go to find out about such a material?

‘Designers don’t want a materials supermarket,’ as one attendee put it. ‘They want deeper knowledge. They want the back-story. But they need a way in too.’ The challenge is to provide both in a way that will appeal to all corners, who may, like the membership of MADE itself, range from industry to academia to the creative arts. All these sectors face tightened economic circumstances. ‘It is a strange time not to be sharing,’ said Johnston. ‘How do we make sure we share, both the stuff, and the knowledge that goes with it?’

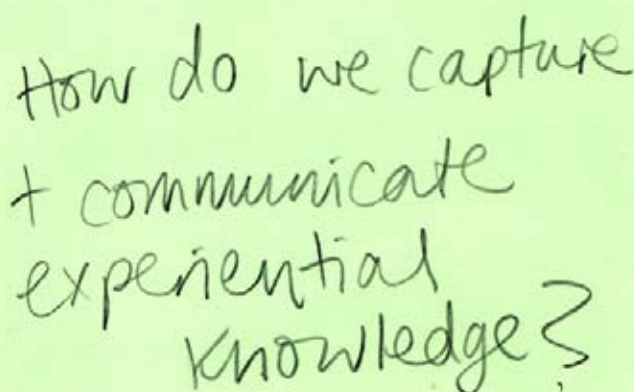
Materials librarians – if that’s what we’re to call them – must confront numerous other problems, too. There is the difficulty of keeping abreast of developments in materials, and making sure that their collections reflect these changes,

which is especially hard when funding for maintaining and expanding them is hard to come by. Finding out about innovative materials is not easy. Nick Rawcliffe regretted that materials librarians 'seem to need to be like treasure-hunters searching and even begging for samples'. Shouldn't these libraries be top of the list when companies unveil these materials? Again, an analogy with the world of books may be helpful. When a new book is published, the publisher is legally obliged to deposit copies of it with certain major libraries. Such an arrangement is clearly a long way off in the world of materials, but it's worth seeing whether a greater onus can be placed on the materials innovators to cooperate. It would, after all, give them some free marketing.



AS A FREELANCER, HOW DO I GET THE SAMPLE OF MATERIAL I WANT FROM A MANUFACTURER WHO THINKS I'M A NUISANCE?

Then there is the fact that people search for materials with different motivations. Some have a particular technical problem to be solved. Others are looking for ideas, inspiration or the serendipity of taking a material established in one field and applying it in another. Some face commercial deadlines and need to cut to the chase; others have time to explore. This calls for a catalogued but also browsable resource, and a curatorial eye that is able from time to time to refresh the presentation of what are after all physical objects, so that interesting materials are brought to the attention of people who might not otherwise tend to find them.



How do we capture + communicate experiential knowledge?

Forum questions inspired by an exhibition of RCA postgraduate student work by the departments of Architecture, Design Interactions, Innovation Design Engineering, Vehicle Design, Printmaking and Animation:

'What impact will rapid prototyping have on emerging designers' knowledge and application of materiality?'

'What is the best text based material resource? Is there such a book for students?'

'Who knows about 3D forming or wood veneers?'

'How do we capture and communicate experiential knowledge?'

'Stainless steel is a difficult and expensive resource when used in seat designs. Can a more sustainable material be found to replace this – laminate? Ceramic? Where would one go to find out about a suitable material?'

'Water distillers use aluminium – could we use something else that needs less energy to produce?'

'As a freelancer, how do I get the sample of material I want from a manufacturer who will probably think I'm a nuisance? '

'Do the big industrial materials producers appreciate the value of materials libraries?'

'Commercial vs. public libraries. Is there competition which hinders the spread of knowledge?'

'Can we persuade people nearing or in retirement to be available on request to share knowledge gained over a lifetime's experience?'

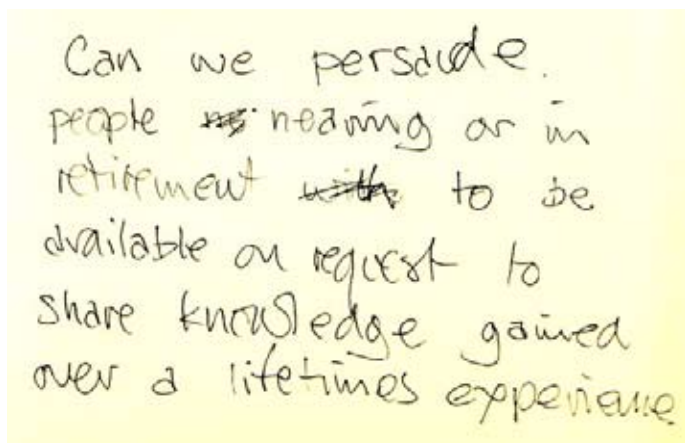
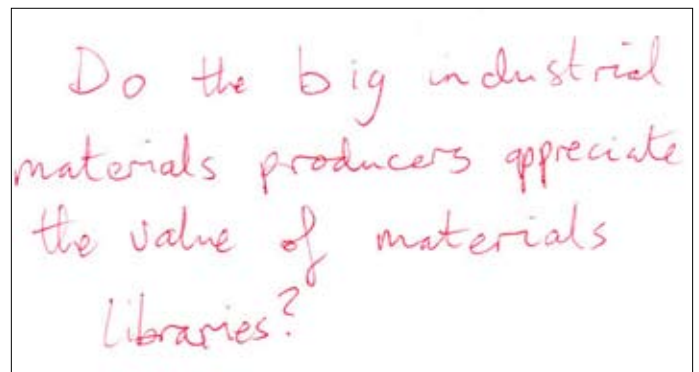
'If knowledge is competitive advantage, can we persuade people to fully share information about materials and processes?'



A tour round the current exhibition of work by RCA students (pictured on the next two pages) began to illustrate the huge number of ways in which materials may be regarded, as well as perhaps to reveal some gaps in young designers' technical knowledge of them. Attendees at the MADE Forum were invited to use these projects to provoke their own questions about materials (some of which are scattered through this report and listed on pages 3 and 5).

Young designers naturally question the categorisation of materials along with everything else. This leads to apparently irreverent, but thought-provoking, projects. Much of the work on display demonstrated an interest in learning from materials in nature, for example. Motives for this ranged from the wish to find superior materials for technological applications to the wish to pass critical comment on the man-made material world. Some designers experimented with perceptions of materials. We all have a mental image of nuclear waste, for instance, though few of us have ever seen any. What if, in exchange for energy credits, we actually kept a lump of it in the garden? A totem like this would physicalise our dependence on this material. It's an idea one can easily imagine extended to other materials which we rely upon without realising it.

Elsewhere, materials are used to create a temporary allure – why is it that architects' models are so much more intriguing than the eventual buildings? The miniaturised representation may be part of it, but the materials are surely another, with models able to use ideal materials, largely without worrying about their performance properties, while the buildings are constrained to use tested materials that inevitably seem more conventional. If the model is an object, made to be appreciated as such, whereas the building is more of an experience, as one architect at the Forum suggested, is this something that these young designers yet appreciate, and what does this mean for the materials chosen in each case? Is this choice of the 'wrong' materials for the model simply an exercise in creative freedom, or does it in fact betray a dangerous ignorance of real material properties? And what is the ever increasing



reliance on digital design processes doing to designers' feel for, as well as knowledge of, materials?

When the prototype of a new design came back from the model shop, it used to be a moment of excitement in the design process, noted Peter Bosson of Colebrook Bosson Saunders. These days, it tends to be an anticlimax, because the designers who created it have a more intense vision of it in the virtual world on the other side of the screen on which they designed it. What does this growing separation between virtual imagination and haptic



realisation mean for the physical quality of products in the future?

The tension between the real and virtual worlds gave food for thought when it came to considering the ideal medium for presenting materials resources. Forum attendees agreed that format and delivery were crucial to providing materials information to the communities who seek it, and that probably both physical and online resources had a part to play.

Many models came out of the discussion that followed. The library-like model was useful but limited, it was felt. One thing that was needed was a different means of providing some background to a material of interest – a kind of YouTube presentation offering expert explanation and demonstration in addition to a sense of the material on its own.

The Forum demonstrated very well how constructive this might be when people could actually get together and interact. At one point, attendees were invited – as if in an AA meeting – to tell the audience about a material problem they were facing. In several cases, a practical answer to the problem immediately came flying back from another attendee. Clearly, regular meetings of a ‘materials anonymous’ group could be mutually beneficial. But could this work more practically and just as effectively as a continuing online forum? Could there be ready access to a network of (retired?) ‘materials geniuses’, for example, along the line of the ‘Apple geniuses’?

Alternatively, perhaps another approach was to build up the sense of occasion around a major meeting of minds. The fact that materials fall between disciplines – physics, chemistry, design, archaeology etc – was both a difficulty in gaining the topic the academic consideration it deserved, but perhaps also a strength. If a convergence of interested disciplines – an analogy was drawn with the highly successful TED (technology, entertainment, design)

Forum questions continued:

‘Could materials database sources list recycled options against virgin material solutions to improve environmentally aware decisions?’

‘Is anyone looking at self-healing materials e.g. for car bodies?’

‘Could you use low drag materials from swimsuits to produce low drag high flow water pipes?’

‘There was a design using a spinning pipe with a slot as a sail – could this be reversed to produce a vertical axis narrow wind generator?’

‘What makes one material or material system more ‘real’ or more material than another?’

‘What kinds of collective resources condition material boundaries and meaning i.e. how do materials acquire particular meaning?’

‘How does patenting and IPR affect our access to materials?’

‘Can old techniques be revived using gold leaf, silver and other expensive materials and is there interest in doing this?’

‘Why isn’t there funding for one big easy access materials library resource in London, rather than lots of little bits here and there?’

‘I am interested in the conviction of materials. Would any material convince you that nuclear power was safe?’

‘Could electronic textiles reflect the mood and wellbeing of the wearer– recording the data for diet concern and stress indicators?’

‘Is there a suitable material that might alert a driver to gas (noxious) leaking into the interior?’



conferences – could be arranged, that might do a lot to heighten the awareness of materials.

In other cases, attendees expressed fears that any materials resource would suffer from the reluctance of commercial interests to display their innovations in case they were copied by rivals. However, others felt it was possible to reveal enough about a novel material for people to become inspired and to gain a sense of what it could do that may be useful to them without giving away the intellectual property that protects how the material actually does it.

Any resource, it was felt, should not limit itself solely to supposedly novel materials. There should be an effort to enable creative users to reappropriate materials of all kinds, from the latest and most jealously guarded proprietary innovations to the traditional and the unfairly neglected. Rocio Bucheli, a gilder who works in Colombia, reported working with indigenous people there and gaining valuable learning about natural alternatives to adhesives, for example. Other attendees cited processes and materials as diverse as the Stirling engine and linen as deserving of a second look.

It should also operate in such a way as to encourage people to explore their own combinations of materials. When they visit the King's College London materials library, artists are looking for ideas, explained Martin Conreen. But all too often he finds they feel they have no licence to experiment. 'They want to make a new material, but they think they can't because they're not scientists. But they can – it's like cooking.' The feeling of creative people that they are surrounded by unwritten rules is a strong one that a good materials resource should try to fight. For example, the familiarity of a material such as glass-reinforced plastic leads people to assume that plastic can only be reinforced with glass fibre, and not with natural materials, say. Yet

there are many possible combinations other than the ones we are familiar with.

As things stand, according to Mark Miodownik, there is a sense in which working with materials at all is seen as antithetical to the 'higher' aspirations of higher education. People today not only have less and less direct experience of making anything than ever before, they may even be losing the motor skills that allow them to manipulate with care, others suggested. Yet the realisation that there is considerable empowerment in making one's own materials and combining them in one's own experimental ways could be part of a fight back against the dominance of digital processes.

All these observations did much to underline the urgency of establishing a more powerful forum for materials experience, which then might have beneficial effects far beyond simply answering the immediate questions of those with specific materials problems.

Hugh Aldersey-Williams is a writer and curator in design and science who compiles MADE's regular e-bulletin of news and events for the design and materials communities.

Hosted by InnovationRCA at the Royal College of Art for MADE, the design exchange of the Materials Knowledge Transfer Network (KTN). MADE brings together the communities of design and materials technology in order to stimulate innovation, promote the transfer of materials knowledge and improve the competitiveness of UK business. The Materials KTN is a Technology Strategy Board programme funded by Government.

www.made.uk.net

www.innovation.rca.ac.uk

Photography: Emilia Serra

UK Materials resources

- The Institute of Materials, Minerals and Mining houses the Materials KTN design exchange resource in London: contact Sumeet Bellara T: +44 (0)20 7451 7315 www.iom3.org; and a second collection in Grantham: www.iom3.org/content/boilerhouse-grantham
- Materials Library at King's College London: www.materialslibrary.org.uk This site has a list of other materials libraries and links at www.materialslibrary.org.uk/MaterialsLibrary/links.htm
- London Metropolitan University: www.londonmet.ac.uk/services/sas/library-services/commercial/materials-products.cfm This site also includes a directory of other materials resources at: www.londonmet.ac.uk/services/sas/library-services/commercial/materials/eresources.cfm#materials
- Kingston University has an emphasis on recycling and sustainability: <http://extranet.kingston.ac.uk/rematerialise>
- Central Saint Martins: www.arts.ac.uk/library/special-csm.htm#mp%20collection
- A drop-in, commercial materials library at 10 Great Titchfield Street, London W1: www.material-lab.co.uk
- SCIN is an architects' advisory service based in London SE1 and on: www.scin.co.uk
- WRAP is a government-funded organisation to help business make more efficient use of material and energy resources: www.wrap.org.uk
- The London College of Fashion has a resource mainly intended for alumni. Contact: l.johnston@fashion.arts.ac.uk T: +44 (0)207 514 8392 www.arts.ac.uk/library/58391.htm
- Ingredients magazine is an initiative to bridge the gap between designers and material manufacturers. Edited and designed by Chris Lefteri: www.moreingredients.com
- Chris Lefteri's materials and design blog is at: <http://blog.chrislefteri.com>
- Hugh Aldersey-Williams's cultural companion to the chemical elements, *Periodic Tales*, will be published in 2011 by Penguin.

International Materials resources:

- Materia, Netherlands: www.materia.nl
- Materio, Paris/Barcelona/Antwerp: www.materio.com
- Material Connexion, US/Milan etc: www.materialconnexion.com
- Material Bibliothek, Stockholm: <http://materialbiblioteket.se>
- Transmaterial online is intended to be a clear, concise, accessible, and carefully edited resource that provides information about the latest and most intriguing materials commercially available: www.transmaterial.net
- Architecno: www.architecno.it
- Material stories by Aart van Bezooeyen inspire and enable the best use of materials in order to make design more competitive, creative and sustainable: <http://materialstories.com>

Forum participants included representatives of:

ARU

Bottle Alley Glass

Butterfield Design

Central Saint Martins College of Art & Design

Chelsea College of Art and Design

Chris Lefteri Design

Colebrook Bosson Saunders

Colour Diversity

Coventry School of Art & Design

Coventry University

Cradle Two

DH product design

Goldsmiths College, University of London

Hothouse Product Development

IN.form

Insider Trends

IOM3

Jackie Choi London

Jake Dyson Products

JKA

King's College London

Kingston University

Leeds Metropolitan University

London College of Fashion

London Metropolitan University

LSBU - Design

MADE - Materials KTN

Materials Library

Morgan Linley Ltd

Queen Mary, University of London (Dept of Engineering)

rawstudio

Rebuchelil

Royal College of Art

Sidell Gibson Architects

SquidLondon

Transport for London

University College London

University of Brighton

University of East London

University of the Arts London

Vanilia Keramia Kft

Viasat

West Country Pets

Westherts College

Wolfson Centre, Brunel University

Yemi Awosile textile & surface design