Ian David, Intensive Care, Queen Elizabeth Hospital, London, 2004
One of a series of installations at the former Queen Elizabeth Hospital, now a dilapidated and abandoned assembly of unoccupied rooms. The work presents a dense cluster of unique fragile plaster-castings where each piece is either suspended or supported from precarious stainless-steel rods. The work recognises the present sense of delicate decay as the hospital slides into a weak and hazardous condition. The castings randomly smash to the floor as slight changes in temperature or air circulation disturb their environment.

DESIGN THROUGH MAKING: AN INTRODUCTION

Should a sound understanding and experience of making underpin design skills? In an age of design data, what does the architect still have to gain from the physical and tacit? **Bob Sheil**, guest-editor of *Design Through Making*, outlines the ideas behind the issue and how they have prompted intriguing and impassioned responses from a diverse array of contributors.

FIRST IMPRESSIONS

Most architects do not make buildings – they make information for buildings. They turn ideas into drawings, models, texts and data, where many results inform the production of buildings and others do not. Among the host of critical and diverse traits required in architectural production, the making of buildings demands an expertise that is familiar with the tactile and the physical. It is a body of knowledge and experience that goes beyond the production of information; it is an area that is sporadically documented and, despite the often extraordinary outcome, it involves a level of skill that many designers cannot claim to fully possess or practise. *Design Through Making* takes a look at this expertise and the shifting territory of where it resides. Its collection of essays from theorists, designers, makers, educators and researchers casts a new light upon skills associated with making and design. It investigates how making is associated with definitions and methodologies of architectural practice. But most of all, its central proposition concerns the fundamental manner in which this relationship is changing.

About a year ago, I invited a diverse team of contributors to be involved in the subject of this issue. Central to my purpose in preparing a broad discourse on a subject for which I maintain a passion was my ambition to measure it against differing points of view and context. It seemed to me it would serve less purpose to engage the reader on one frequency than offer the subject as a question in

Detail of Ian David's Intensive Care installation at the Queen Elizabeth Hospital, London, 2004.

which many positions are valid. I could not help but guess what I might receive in return later on, and was gratified when this turned out not only to be surprising, but also personally illuminating. Subsequently, what views I took for granted have now been enriched by sharper insight and broader scope.[1] Even so, I am quite sure the question can go much further, and look forward to pursuing the ideas and issues raised within, again and again, in collaboration with my inspiring colleagues and students in architectural practice and education.

I must at first pause and refer to one of my final editorial tasks, and probably your first impression of this issue – the book cover and on it the image of Orgone Reef. I first encountered an earlier generation of this artefact at an exhibition in central London against the formidable backdrop of trade-show paraphernalia. Its presence was instantly spellbinding. It glistened, twitched, and dispersed its feathery entrails as my senses were well and truly switched on. The sight before my eyes was truly special. I soon understood how it was made and the obsessive reasons why. I was pleased that the conglomeration of enthusiasts its designer and maker Philip Beesley gathered together fulfilled their innovative research as something exquisite. Nevertheless, despite the care taken to reproduce the work as an exquisite image, what you see is not the real thing. And therein lies the greatest hurdle for anyone wishing to convey a message on the physical and tactile nature of design through printed matter.

TECHNIQUE

The prospect of realising ideas into built form is a transition during which some qualities are gained and others lost. As immaterial and intangible ideas develop, the question of how things are made generates a period of opportunity. If equipped with a critical understanding of the rich potential of this phase, the designer will approach this transition with confidence, prepared for the indeterminate nature of working with resistance,[2] and adapt to change accordingly. Architectural design does not end as the tools of fabrication are put into action. On the contrary, making is a discipline that can instigate rather than merely solve ideas – in other words a design process.

Some architects, such as the members of Rural Studio, do make buildings, and they make them without a dependency on conventional design information. Theirs is a process where, for instance, the finding of affordable and reappropriated materials is instigated as the requirements of the project emerge in conversation with the user. It is a process where outcomes are expected to evolve throughout the act of making the building rather than performing the process as a contingent event of a preceding design strategy. A first-hand account by John Forney explores this territory later.

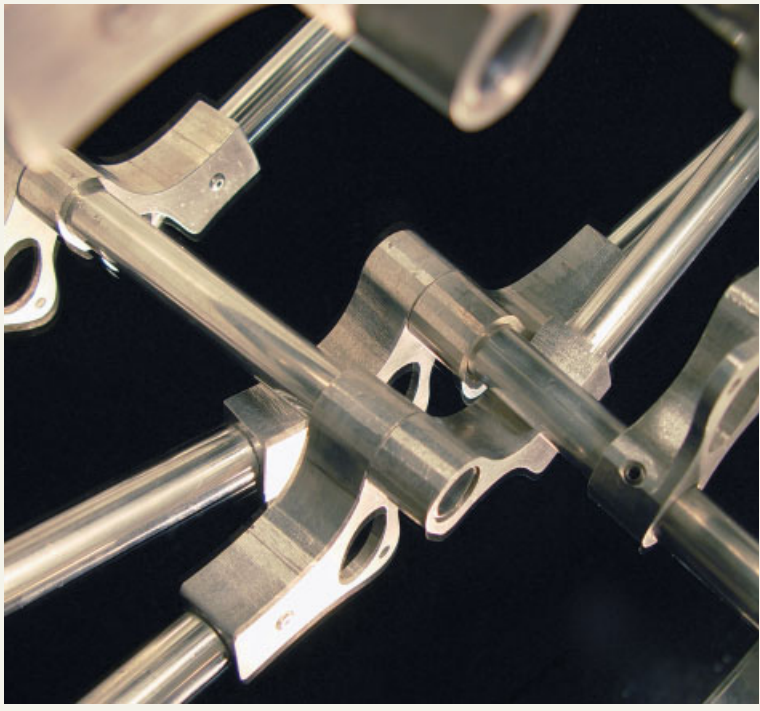
EXPERTISE

In piecing together this issue, I wish to present a new connection between design practice and its physical and tactile outcome. In doing so, I believe it will be recognised

Tom McGlynn, Under Observation, Queen Elizabeth Hospital, London, 2004
Between theatres 1 and 2 is housed an aperture of cross-observation. Eliminating sound and preventing touch, all surfaces that once emanated function and utilisation gather dust and germs. Surrounding the aperture is a new system of twinned light fittings and polished plate-glass. The new system is tailormade, but is useless: it exists merely to draw attention to abandonment and absence. Fading in and fading out, occupants on either side activate the system, which causes their image to appear, merge and then disappear on the glass plane between them.

that we have entered an era where expertise in making is becoming repositioned at the centre of architectural practice. For architects, the new era is most clearly defined by the revolutionary change in making information. It is led by a convergence in the properties of digital drawing and the automated techniques of manufacturing into the hybrid and adaptive technology of CAD/CAM (computer-aided design/computer-aided manufacturing).[3] Armed with an array of new tools that draw and make, the CAD/CAM operative is neither a designer nor a maker, but both.

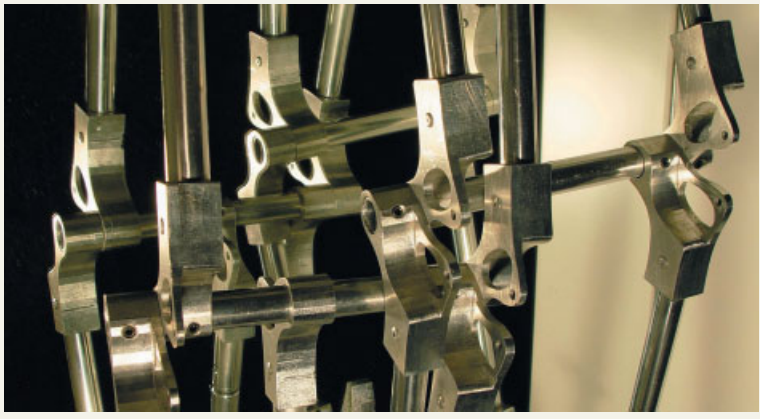
The operative is presented with new synthetic tasks where the consequences of information generate an immediate and mirrored response. It has taken time, however the gap between information and making has been bridged, and is irreversible. As the technology of digital fabrication gathers momentum in architecture, this journal is an acknowledgement of its effect as a new catalyst within a broad reappraisal of making and design practice. Old skills have reappeared alongside new as complex automation technology offers exciting potential to readdress everything from mass industrial to handmaking techniques. Digital fabrication has indeed sparked a revolution in many technological respects, but it has also implied that the expertise of designers and practitioners must also be revolutionised. Reforming a fundamental component of architectural discipline is clearly more than a matter of technique; it is also one of culture and context. It is therefore a principal aim of this issue to position this change in a broad context of theory, culture, history and craft. The selection of texts included is therefore varied in its purpose, origin and outlook.



Top and above
Alastair McDonald, Eavesdropping, Queen Elizabeth Hospital, London, 2004
Contained within the reveal of a basement sash window, the work incorporates a fitted and curiously modulated surface concealed behind a hinged privacy screen. The project investigates the relationship between immediately adjacent public and confidential spaces and their reappropriation for devious and intimate purposes – something akin to twitching net curtains.

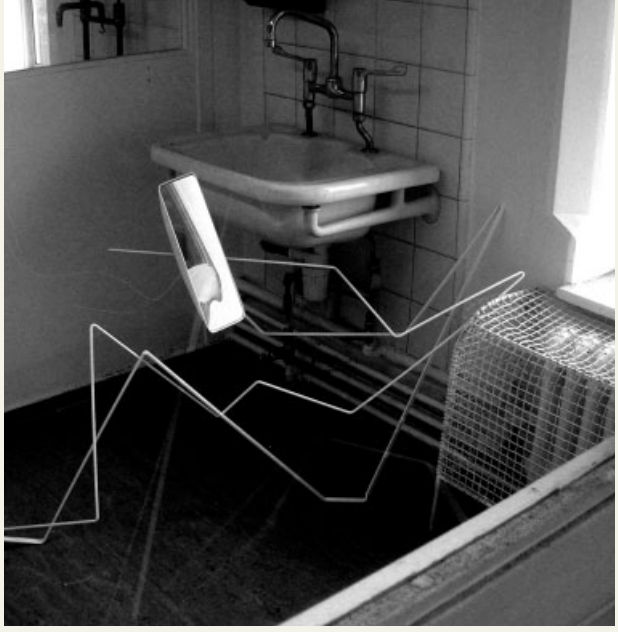
DRAWING

Not surprisingly, the most difficult aspects to convey in this medium are acts of making. Like the allusive nature of the nonillustrated recipe book, in which the outcome is somewhat of a surprise, acts of making are not documented to the same extent as instructions to make. My contributors hail from diverse backgrounds: not all are people who make, but all address the relationship between the craft of design and making in terms particular to their expertise. The series opens with Jonathan Hill's 'Building the Drawing', a characteristically lucid account of



Above
Martin Xavier Perez Broby, Digital craft 1, Queen Elizabeth Hospital, London, 2004
Universal components for anatomical enclosure, an assembly to form a reconfigurable series of suspended wings and frames.

Martin Xavier Perez Broby, Digital craft 2, armature component, London, 2005
Recent investigation into merging traditional and digital fabrication techniques for 1:1 furniture components in cast pewter and laminated wood.



Christos Lefakis, The 10th Occupant, Queen Elizabeth Hospital, London, 2004
The isolation ward on the mezzanine level is characterised by a series of nine adjacent rooms, each separated from one another and a corridor by a half-glazed partition and door. Through a series of new inhabitants, each emitting a unique pulsating and incremental frequency, the work investigates conditions of occupancy, surveillance, attendance and absence. Visitors are immediately absconded into a duty of care for all bleating patients.

Architect, maker and calligrapher Louis Lafargue transforms ad-hoc objects such as bullet casings, fishing tackle and electrical components into curious and exquisite jewellery for people and places.

histories in the practice of architecture based upon drawing as the primary product of the architect. Hill highlights the multiple applications that drawings serve, the drawing as analogue, drawing the immaterial, and drawing through making.
It is the place we must begin, the place where drawings and words establish their role in relation to our subject.

Hill's article is followed by a series of counterpoints that allude to making's place in design: Mark Burry on our growing dependency on computation, Michael Stacey on craft, Phil Ayres on the nature of specificity in generic design, Nick Callicott on capturing the tacit through adaptive manufacturing techniques, and Sarah Chaplin on cultural diversity on notions of permanence and making, and distinction. Interspersed are a series of accounts on built works that convey their unique character and purpose in respect of representation, behaviour and form.

TOOLING

In a speculative contribution on the nature of drawing instruments, Nat Chard develops critical insight into the methodology of drawing and prompts us to consider architectural practice as a reflective history of technological change. The invention of the blast furnace, the development of polymers, textiles and so on, were key events that radically altered the direction of design. Yet until quite recently the primary products of the architect, the drawing and the model, have remained relatively

sixteen*(makers), Blusher project, Güsten, 2001
Components of the project awaiting digital fabrication momentarily appear on the CNC plasma-cutter's monitor; 45 minutes later, all 21 pieces were complete.

Mark West, Building a Way to Build, Winnipeg, 2005
Detail of concrete beam cast from fabric formwork, the work of Mark West, director of the Centre for Architectural Structures and Technology (CAST), University of Manitoba Faculty of Architecture.

consistent in character. Ideas and buildings have altered substantially, but design representations of the 20th century offered information much in the same way as those of the 19th. Such drawings required a particular expertise to ensure that the idea was understood and survived. They had to be efficient, clear, appropriate, skilful and expert, yet being transmitted into the tactile and physical world by a process that was subject to negotiation, they were reliant on translation.

Subsequently, making was at risk of becoming a responsive act, a demonstration of how effectively ideas were communicated by the information and read by the maker. The drawing instruments of Chard and his colleagues are a determined effort to challenge and reinvent the basic tools of the designer. The fabrication of specific tooling is a commonplace practice of manufacturing. In some instances, such as the torque ellipse forms by Richard Serra, the production of form is entirely dependent upon finding the right tool. Chard implies that in order to act as innovative designers, we must design appropriate tools as a continual by-product of the investigation.

ADAPTATION

By returning to the catalyst of change, digital fabrication implies that making drawings and making buildings are now inseparable entities – their interdependency has become a connected circumstance rather than a negotiable one. Designers, conventionally the makers of drawings and models, have in their grasp the opportunity to relocate to the centre of building production with a powerful array of tools to convey innovative propositions that are fused with the information to make them. Yet the more difficult question raised here is that which asks whether they are equipped with all the necessary knowledge and expertise to

By returning to the catalyst of change, digital fabrication implies that making drawings and making buildings are now inseparable entities – their interdependency has become a connected circumstance rather than a negotiable one. Designers, conventionally the makers of drawings and models, have in their grasp the opportunity to relocate to the centre of building production with a powerful array of tools to convey innovative propositions that are fused with the information to make them.

Alastair McDonald, Eavesdropping, Queen Elizabeth Hospital, London, 2004
Handmade/hand-held modulated polymer 'clinical' surface.

do so? Do centuries of making information for the production of buildings form a sufficient basis on which to exploit this new opportunity? Should new skills be learned, should the design environment be redesigned?

It is clearly essential that all aspects of what is emerging from this shift are examined. Making is an immense resource for ideas, experimentation and research, but to reiterate the opening remarks, it requires expertise in the physical and the tactile – it is a tacit expertise. With it, designers may develop skills equal to their powerful repertoire of representational skills; without it, a great opportunity will be missed. If architectural designers do not grasp the centre of building production by taking command of the art and craft of construction, when now they are offered the chance, who will? AD

Tom McGlynn, Under Observation, Queen Elizabeth Hospital, London, 2004
Ambient lighting of redundant operating theatre.

Alastair McDonald, Eavesdropping installation.

Notes

1 I am therefore deeply grateful for this opportunity and must thank not only each contributor, but the commissioning editor, managing editor, copy-editor, book designer and publisher, who have offered nothing less than full support throughout the drawn-out process of putting this together.

2 Numerically controlled (NC) machinery was first developed in the 1950s for the US military. Its subsequent proliferation has largely occurred within the automobile and aeronautics industries where an automated, but inflexible manufacturing process realised the potential for rapid adaptation to change. With efficiency and development, NC became CNC as computer numeric-control systems centred upon factory-based manufacturing processes and successfully managed a speedy transition towards a system of devolved specialisation and greater specificity. The relatively recent breakthrough of CAD/CAM into architecture has been the result of having first to develop the advanced interface of CAD so that CAM processes are instigated via drawing techniques rather than a requirement to understand the necessary programming language. This aspect is expanded upon in greater detail later on in Nick Callicott's article 'Adaptive Architectural Design'.

3 Some of the images presented in this article are taken from recent work of Unit 23 at the Bartlett School of Architecture, carried out at an abandoned building in London. Further information can be found at www.bartlett.ucl.ac.uk/architecture/programmes/units/unit23.htm and www.bartlett.ucl.ac.uk/architecture/events/lobby/u23_snapshot.htm

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