

Art, Materiality and Representation: 1-3 June 2018 **Speaking script**

P055 The Anthropology of drawing

Venue: SOAS - Main G51a Time: Friday 1st June Sessions 1, 2 and 3 11.30-13.00; 14.00-15.30; 16.00-17.30

Industrial design, body imaging, and the ultrasonic life room

Ultrasound scanning of the live foetus in the womb was pioneered in the 1950s and 1960s by Professor Ian Donald, Regius Chair of Midwifery at Glasgow University. This procedure offered an unprecedented view of the unborn child that affected the imagination and understanding of doctors and patients alike. Working with Donald and his team, Dugald Cameron, a recent graduate of industrial design at Glasgow School of Art (GSA) designed the first commercial production version of ultrasound equipment at the start of his career as an influential design educator.

Drawing on the recently acquired Dugald Cameron archive collection of drawings at GSA, this paper considers the range of drawing and imaging practices that were adapted and called into being in this design process, from new ergonomic concepts in industrial design to traditional life room skills. One question to be addressed is the role of the life room and its close study of human anatomy, and the ways in which study of the human form migrated into ergonomic procedures of design drawing. Ultrasound equipment was an imaging technology that was used by human operators in order to peer into other human subjects. While acknowledging the biopolitics of these techniques of body imaging, however, the immediate focus of this paper will be on the drawing strategies and techniques of designers engaging with medical industrial design, using drawing archives and oral testimony from practitioners such as Cameron and some more recent of his successors at GSA in the field of medical imaging.

I discuss the questions raised by the industrial designer Dugald Cameron's archive of drawings. As a final year student, Cameron designed the first commercial versions of medical ultrasound scanning equipment in the early 1960s; helping to shape obstetric practice in antenatal care worldwide.¹ I was struck by two equally important parallel streams of drawings in his portfolio: life drawing; and industrial designs, including the ultrasound scanner work.

One question I address is the role of the life room and its close study of human anatomy, and the ways in which these established approaches to human form migrated into ergonomic procedures of design drawing.

As historians of ultrasound, and feminist commentators on the 'medicalisation of childbirth' have noted (Nicholson and Fleming 2013; Oakley 1984), ultrasonic imaging of the fetus has had a momentous social impact. Strangely enough, though, although there were plenty of 'identity politics' at play—in feminism and in pro-life campaigners, recruiting the foetus as a new kind of social actor--there was little feeling of disquiet or conceptual disconnect at peering into the body. While a contemporary design researchers, examining design for medical use in the field of prosthetics might note almost routinely the uncanny aspects of this work, what was strange in the ultrasound era, with an imaging technology where

¹ I was initially asked to get involved examining archival drawings that will be used in an exhibition to be held in Glasgow School of Art (GSA) this autumn and also to comment on the impact that this invention had on the hidden subjects in this process—the women undergoing ultrasound scanning in these early experimental period. What I am discussing today has some connection with this initial consideration, but it has taken on its own momentum as a longer-term research project.

human operators peered into other human subjects is what I call the 'engineer effect' or technocratic function of normalisation, the technique was rapidly pulled into common sense knowledge and practice—it wasn't uncanny, that is what is weird. While acknowledging the biopolitics of these techniques of body imaging, I cannot expand these issues today. My topic today is visual material, archival and unpublished collections of drawings—first from the archive of Dugald Cameron that I will supplement and compare with student life drawings from the 1970s of a later practitioner, Alastair MacDonald, now Senior Researcher in the School of Design at GSA with special focus on design for health. I will show these drawings right through the presentation—I have already started—and will return to analyse and discuss these in depth in the second half of this paper.

Recent publications such as *Redrawing anthropology* (2011) have examined how anthropologists use drawing and how they have used this medium to interpret processes of design and making. Complementarily, designers also increasingly draw on anthropology and ethnographic methods. Anthropology IN design denotes an interest in the end user, and in the social networks around investing meaning in objects. Alison Clarke's collected volume *Design Anthropology* (2017) posits a new humane and poetic breed of designers, positioning themselves rhetorically against older design practices—described as more instrumental. This paper within this panel is however interested in something slightly different, in the anthropology OF drawing, enquiring about the different social groups who define themselves by their investment in different kinds of drawing practices, and different visualisation practices.

As a rapid overview of context I introduce a) the evolution of the skills and behaviours laid down in the life room over its long history in art education. b) consider industrial design, and mechanical engineering also in art school training in draughtsmanship since the nineteenth century. In the nineteenth century the machine became a substitute for the human body. Mechanical engineers analysed the geometrical actions carried out for example by the weaver's hand, translating these into banks of machines on the factory floor tended by human machine minders, a process of automation that still continues with robotics. Here design training was about shaping people to machine actions. c) Ergonomics, or 'human factors' was a technique that attempted to reconcile humans and machines developed in the period after the Second World War—this is the design period and legacy addressed in the drawings and testimonies from my two interviewees.

The anthropology OF drawing, the social group of my industrial designer subjects who have defined themselves by their investment in different kinds of drawing techniques, and different visualisation practices.

The life room has a long history in art training going back to the Renaissance: As Deanna Petherbridge notes: 'academic practice from its inception has been constituted around drawing from the nude; studying the body as the repository

of classical and 'scientific' information meant that artists could assert higher cultural status as liberal humanists. The life class is an artificial construct: not only about looking, but also about control; an authoritarian space dedicated to silent concentration, controlled lighting, and immobile bodies (Petherbridge 2010: 221-222).

State funded European art schools in the 19th century brought in a more commercial, practical and utilitarian ethos. Life drawing was tolerated as an exercise in delineating complex forms—often with a strongly simplified geometric emphasis on cylinder, pyramid, or cube. In the twentieth century this abstracted approach was further refined through the influence of William Coldstream, Director of the Slade School of Art. This aimed at scientific objectivity concentrating on geometrical relationships, developing neutrality in an object-like rendering of the body (Petherbridge 2010: 231-232).

Murrell, K.F.H (1965) *Ergonomics: man in his working environment* London: Chapman and Hall

Tilley, Alvin R. (1993) *The measure of man and women: human factors in design* New York: The Whitney Library of Design

Ergonomics, sometimes called 'human factors' in design is a twentieth century initiative. This was intended to address worker stress and productivity in factories for example in the British Industrial Fatigue Research Board (IFRB) (Murrell 1965: vii). During the Second World War, with the rapid development of military equipment and machinery, the complexity and operating speeds of weapons or aircraft subjected the human operators to stress they could not deal with and as a result equipment either suffered breakdown or complete failure, etc. [viii]. After the War the Ergonomics Research Society was formed using the new word *ergonomics*, from *ergos*= work and *nomos*= natural laws. [viii] In the immediate post-War period most data from the experimental subjects (human workers) came from a small distinct cohort of young, male, and fit individuals, etc) with relative lack of research in normal industrial contexts nor any other environment [x].

Ergonomists such as Murrell concentrated on the working environment using a conceptual notion of the 'closed loop servo-system' with many feedback characteristics, aiming for a man-machine system with 'maximum efficiency', [xv]. He describes the human body as a kind of input-output machine, registering perceptual factors such as light, heat, sound, etc and outputting work. Here the human body is described as a system of muscles joints and bones consisting of 'two major systems of levers –arms and legs. 'The internal organs which lie in the chest and abdomen are only of interest in the present context in that they are the sources of supply for the fuel which is consumed when the muscle does its work' (Murrell 1965: 16). Recent design commentators, from a 'design anthropology' viewpoint now criticise 'human

factors' approaches that used a physiological and cognitive psychology evidence base, rather than more flexible, nuanced 'participant-observation' styles.

Images from Murrell of diagram p. 51 Fig 15 a movements of the head, b movements about the shoulder

facing page 144 tipped in photoplate, Fig 53a a girl sitting on a 19-in chair

Tilley, Alvin R. (1993) *The measure of man and women: human factors in design* New York: The Whitney Library of Design

'Henry Dreyfuss Associates, an industrial design consultancy, has led the way in applying human-factors data to product development for more than 60 years. Now, in a comprehensive revamping of the company's earlier landmark book, *The measure of man*, published in 1960' and this is an update, p. 7

IMAGES used p.26 'computer stations for women'

p. 17 'angle movements of body components (top view)

p. 14 'Measure of woman (side view) Dreyfuss

Dugald Cameron entered art school in 1957

Life drawing: Observational, edges of objects, fixed point perspective as means of capturing three-dimensional appearance in two dimensions, that is, with the lines as they appear through the 'grid' or 'window' –in the way that is familiar to us from Renaissance treatises on correct perspective. We also have echoes of architectural and mechanical drawing techniques of front/ side/ plan and section views of objects and artefacts.

Cameron also had weekly classes on artists anatomy—in fact this was part of the heavy emphasis on life drawing—because it was intended to equip students to be art teachers in school—as in the 1950s and 1960s this was the main route into employment for art students. Another skill or test that was built up in class was that of memory drawing. Finally, and this emotional dimension could be relevant too, is Dugald's memory that the first life classes were slightly tense because this was not only a new and testing activity for art students, but they were going to be in a mixed sex group, observing and drawing from the nude.

Design drawing and ergonomics: Cameron has two styles of drawing, one very exact and detailed—expressed as either technical and specification drawings, but also as finished 'presentation' drawings—through these are usually rendered as paintings, in hyperreal or photoreal style. His favoured medium for these was either gouache or, at a more minute level, Humbrol enamels which are the kind of paints used in model making. The other style Dugald used for design drawings is more gesturally energetic, partly because Dugald himself is an energetic and active personality, but also, to show a process of thinking, with a sense of trying out speculative forms to get the right configuration, and give a sense also of the

moveable quality of the object. I've encountered this kind of mixture of styles before in the work of the mechanical engineer James Nasmyth—where the energetic clouds of lines he used—for example when he was thinking through how to design a railway transport bed component, ran in parallel to exact and minute finished drawings for publicity and contractual purposes.

Cameron was influenced in ergonomic approaches and design style by American industrial designers. In ergonomic manuals and guides, especially in these diagrams of body movements in for example in the Dreyfuss approach as shown in *The study of man and woman*, and in Murrell's diagrams also, we see an interesting hybrid of mechanical drawing and life room observational thinking.

The body is treated here in a kinematic manner. Kinematics in mechanical engineering and in physics is the study of the geometrically possible motions of a body or system of bodies—evidently in ergonomics the constraints on the possible movements of the body are physiological as well, so there are more constraining factors to take into account. But in these diagrams, and in the approaches to drawing the body through life room study that were dominant in Britain since around 1800 (that kind of front/ side/ plan, etc views described by Goldstein 1996).

Visualising bodies—ultrasound development: Cameron had sympathy and enjoyed working with doctors, as he felt that there were shared approaches to knowledge. He described industrial design, engineering, and medicine as sharing some 'trade' or craft characteristics—especially in relation to understanding how bodies and complex structures are put together and how they work—so he saw the high level of technical and tacit knowledge gained by experience—in relation to ultrasound, the ways in which doctors had learned to 'read' the body of a pregnant woman and the status of the foetus through palpation—seeing through feel, through the hand. [Alastair's comment about SimVis work in medical visualisation, digital bodies are 'made' through scanning and then computer rendering—not through dissection or handling the live bodies—a question about how this becomes interiorised and 'learnt']

Alastair MacDonald entered art school 1973: Had studied earth science at University for one year, then started again at art school studying Fine Art for one year. Here he was tutored in life drawing by Fine Art staff, including the Royal Academician Barry Atherton. Constant attention on seeing, recording, translating. Certain techniques such as arms' length measuring, delineating negative space. Like Cameron he aimed to capture the whole outline of the form, but also to break down the surface, and to look within—for example, attempting to explain the internal structure and articulation of different parts—for example of the shoulder. But also in 1973, there were other anti-traditional forces vying for power in art education—conceptual approaches, mixed media approaches and experimental pedagogical approaches. MacDonald engaged in his own programme of study, reading up and observing how other artists such as

Leonardo, Mantegna or Durer had tackled the body, and he also bought his own copy of Gray's Anatomy. He also devised his own methods for learning the body—and methods of visualisation that are extremely interesting to consider in relation to development of body visualisation in design and design for medical and health applications. When MacDonald shifted away from Fine Art and towards Product Design in 1974, it was not for the reasons one might imagine. He saw that despite the alternative approaches in parts of Fine Art, most final degree work tended to follow in the now completely respectable paths of 'Scottish Colourists'—a school that had been dynamic around the time of the First World War. Product Design, by contrast, was full of creative and exciting new social and alternative ways of thinking about how life and society could be conducted, illuminated by such 'green' activists as Victor Papanek. So for MacDonald, the notion of 'ergonomics' is a double-edged one—on the one hand it can be used in a utilitarian and instrumentalist manner, or more humanistic, respecting the person and their thoughts and aims.

Questions arising: Tom Brown, 'perceptual function of the user.'

Who is the user, doctor or patient? Or foetus inside the womb: a new protagonist brought into the arena via the visualisation

Extension of body and faculties, TOUCH palpation of the hands

Alastair Macdonald

Conclusions: Further directions, feminist

Second wave feminists regarded the ultrasound scanner with suspicion, accusing the technology as an impersonal mechanical intrusion into the intimate realm of childbearing [N&F 11].

Baxandall, M. (1974) *Painting and experience in fifteenth-century Italy* Oxford: Oxford University Press

Becker, Howard S. (1982) *Art worlds* Berkeley: University of California Press

Bell, Quentin (1963) *The schools of design* London: Routledge and Kegan Paul

Brown, T.G. (1999) Development of ultrasonic scanning techniques in Scotland 1956-1979, Personal recollections by T. G. Brown and Virtual Reality in Ultrasonic Imaging: a project out of time? T. G. Brown 1999. Available at <http://www.ob-ultrasound.net/brown-on-ultrasound.html>

Chamber, Emma 'Slade School Influences on the Camden Town Group 1896–1910' <http://www.tate.org.uk/art/research-publications/camden-town-group/emma-chambers-slade-school-influences-on-the-camden-town-group-1896-1910-r1104373>

Christie, D.A. and Tansey, E.M (2000) Looking at the unborn: historical aspects of obstetric ultrasound. Wellcome Witnesses to Twentieth Century Medicine Volume 5 – January 2000 A Witness Seminar held at the Wellcome Institute for the History of Medicine, London, on 10 March 1998. Accessed 21 April 2017. Available from www.histmodbiomed.org/sites/default/files/44827.pdf [Wellcome Witness Seminars, 1993-1999, 'Obstetric ultrasound: historical perspectives' organisers Dr. Malcolm Nicolson and Dr. E.M. Tansey]

Clarke, Alison J., ed. (2017) *Design anthropology: object culture in the 21st century* New York: SpringerWien [Open access online at: https://issuu.com/design.nerve/docs/design.anthropology_object.culture

Goldstein, Carl (1996) *Teaching art: academies and schools from Vasari to Albers* Cambridge: Cambridge University Press

The History of Modern Biomedicine. Interview with Dugald Cameron, 28 May 2014, Glasgow Art Club. Accessed 21 April 2017. Available from <http://www.histmodbiomed.org/article/dugald-cameron>

Hale, Robert Beverly (1991) *Master class in figure drawing*, compiled and edited by Terence Coyle New York: Watson-Guption

Ingold, Tim, ed. (2011) *Redrawing anthropology* Farnham, Surrey: Ashgate

Lane, Denicola (2017) 'The digital as para-world: design anthropology and information technologies' in Clarke, Alison J., ed. (2017) *Design anthropology: object culture in the 21st century* New York: SpringerWien: 202-211

Murrell, K.F.H (1965) *Ergonomics: man in his working environment* London: Chapman and Hall

Nicolson, Malcolm and John E. Fleming (2013) *Imaging and imagining the fetus: the development of obstetric ultrasound* Baltimore: The John Hopkins University Press

Oakley, Ann (1984) *The captured womb: a history of the medical care of pregnant women* Oxford: Blackwell

Parkes, U.W.A. (1949) *Artistic anatomy of the human form*, 2nd edition London: Staples Press

Petherbridge, Deanna (2010) *The primacy of drawing: histories and theories of practice* New Haven and London: Yale University Press

Tilley, Alvin R. (1993) *The measure of man and women: human factors in design* New York: The Whitney Library of Design

Wasson, C. (2000) Ethnography in the field of design *Human organisation* 59 (4): 377-388

Designing an industrial living room? These industrial interiors utilise exposed brick, copper, iron railing, concrete walls and wooden crates to full effect.Â Designer: Hao Design. Mix the industrial and the heroic in this unusual living room. Part of a superhero-themed home, an exposed brick panel stands beside a row of camera lighting, as a Marvel star shines in the metal bookcase. Quilted leather couches hark to the rustic with a cow hide rug, while a hi-vis orange lamp and metal table make it industrial. 17 |. Visualizer: Dmitry Tisnoguz.Â Potted trees add life beneath three framed photographs, while a cascading wood and steel bookshelf holds memories in trinkets. 21 |. Visualizer: Darkroom Studio.