

## Working diagrammatically: instrumentalising interior space

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**Abstract:** This paper traces several examples of how working diagrammatically new understandings of interior space are forced into appearance, and questions the traditional ground of dominant architectural strategies. Several key texts are discussed relative to diagrams, occupational activity and spatial resolution in order to examine the implications of such thinking.

Of these texts, some by Catherine Beecher and Harriet Beecher Stow, and Melusina Fay Peirce, propose relationships between occupant and space as fluid encounters, supported by movable walls and screens. The sophistication of such proposals as a new form of living might, in ordinary circumstances, be enough, however they took it further. Other writers such as Mary Haweis, and Dorothy Todd, also work in this manner, as they individually propose the interior as an unfolding form the body, or an outward projection. In their own way both shift away from the advice writers concern with aesthetic qualities towards a diagrammatic understanding of relationships between body (female) and space (home).

The paper concludes by demonstrating that in some situations the diagram, rather than represent concepts and objects external to architecture, retains an instrumental role resolute with inherent abstract potentials. That is, it reprograms space relative to specific rather than general attributes, opening the interior to investigation in a political sense.

### Introduction

The interior is subject to diagramming in many guises often devised by architects concerned with human efficiencies and standardisation, particularly when structuring, organising and occupying space. The results include adjacency relations, bubble diagrams and so on have been well documented and tend to influence perceptions and practice of interior design. Alongside this exists another legacy that concerns interior design's emergence and professionalization through advice writing and a specific engagement with the morphology of body and space as lived and practiced. This includes women concerned by traditional spatial organisations of the home when seen in light of enfranchisement and ideals of the late nineteenth-century 'new woman'. That is, both feminist and socialist examinations of the home and their respective diagramming as haven or commune. Other concerns include spatial engagement of the body with surroundings and personal identification, particularly aesthetic judgements, gendered spaces and sexuality.

Much of this writing and practice on the interior emerged in the late nineteenth and early twentieth century and is generally understood as having little influence on mainstream architecture. Hyungmin Pai in the *Portfolio and the Diagram* (2002) stated that even though a circulation diagram appeared in a book on house planning, "this kind of advice book was marginal to the formation of the architectural discipline".<sup>1</sup>

This paper questions this presumption, not to challenge the architectural canon that leads to such views, but in order to expose how diagrams and diagramming operate in the development of ideas associated with the interior. That is, ideas generated from specific reflections and observations on the use, organisation and modes of inhabitation when seen alongside issues prevalent to the practitioners and writers of the period. To some extent the

diagrammatic thinking discussed here is rooted in immanence, or the lived-in-the-present daily practice, rather than transcendent or static values.

### Diagrams and diagramming

There is a growing body of evidence to suggest that techniques and practices of architectural knowledge have, in recent times, shifted. Robert Somol in the essay 'Dummy Text' (1999) argues that this shift over the last half of the twentieth century is from drawing to the diagram. He qualifies this by confirming that:

a diagram of one form or another was not always constitutive of architecture at various points in its history, but simply that it has only been in the last thirty years or so that the diagram has become fully 'actualized,' that it has become almost completely the matter of architecture.<sup>2</sup>

At the time of writing he points out that the discourse of the diagram has become confused due to its use and abuse, as well as "simultaneous promotion and denigration." Somol is clear that even for the animate work of the neo-avant-garde, the diagram operates *between* form and word, indicating that it is:

fundamentally a *disciplinary* device in that it situates itself on and undoes specific institutional and discursive opposition... and suggests an alternative mode of repetition.<sup>3</sup>

That is, where traditional forms of repetition might enable knowing through repeating existing structures, new forms of repetition might include alternate strategies and constructions that are non-linear and non-hierarchical (cultural, political and social).

Hyungmin Pai in *The Portfolio and the Diagram* (2002) also confirms that the diagram is a specific device that is a modern mode of representation. He suggests that unlike traditional plan drawing which is concerned with construction, the modern diagram is part of the "discursive code that organizes reality in order that it may be both visible and usable."<sup>4</sup> Its essential criterion therefore, is instrumental rather than 'resemblance'. Metaphor, a second conceptual formulation discerned by Pai, is characterized by diagrams of factory production and household management, particularly when seen as rhythm, flow, movement and so on. In these examples the translation of principles of scientific management to the control of society, evolved terms such as 'man as machine' in parallel with social and human engineering.

Other forms of control are found through Jeremy Bentham's Panopticon; a nineteenth century design for a prison. In his examination of Deleuze's writing on Michael Foucault's 'panopticism', Mark Jackson discusses the 'diagram of power' as a means to understand "productive and coercive mechanisms of control."<sup>5</sup> Panopticism is, according to Somol:

the diagram of modern disciplinary societies, one which underlies multiple institutional types (prisons, hospitals, schools, factories, barracks, etc.), and one that can be most abstractly characterized by the attempt "to impose a particular conduct on a particular human multiplicity."<sup>6</sup>

These relations of power were to some extent bound up with forms of knowing where 'form' was both, "the organisation of matter into visibilities and the finalisation of functions into statements... however, [relations of power] work with unformed, unorganised matter, and unformed, unfinalised functions."<sup>7</sup> Thus, Somol again;

the importance of the lesson of panopticism is not simply to appropriate that figure as

the new organizational system, but generally to understand (and configure) society as a plastic entity, susceptible to multiple (virtual) diagrams and possibilities for arrangement.<sup>8</sup>

Having outlined this shift and the way the diagram became instrumentalized in recent architecture Somol described the process of 'working diagrammatically' as necessitating a "particular orientation, one which displays at once both a social *and* a disciplinary project". It achieved this possibility "not by representing a particular condition, but by subverting dominant oppositions and hierarchies currently constitutive of the discourse."<sup>9</sup>

This paper discusses 'working diagrammatically' where ideas put forward are closer to Somol's 'information architects' than conventional practice concerned with arresting gravity. In this process information on society and space, sexuality and space, and so on, are made visible through the diagram.

### **Spatial diagrams: dressing the interior**

The nineteenth century art critic, advice writer and enfranchisement campaigner Mary Haweis (1848-1898) turned to the wider discursive fields of material culture and domestic decorative strategies as a framework for understanding spatial relations between body (female) and interior (domestic). This particular interest in women's occupation of the domestic realm broached a connection between interior spaces, women and the body as an ambiguity whereby the interior was both a projection of the body, and a carefully constructed setting for the presentation of "beauty's worth".<sup>10</sup> More particularly she used 'dress' or 'dressing' to index both a thing and process.

Understood as a mirroring of the body or a projection of the domestic body into its environment, surroundings became an extension of self achieved by, "carefully decorating our rooms as a background to our figures".<sup>11</sup> To pacify the inevitable backlash from a literalist interpretation of artistic intent, she argued that dress became the first outward projection and wall ornamentation was another, evidenced by the idea that people do not adapt to their walls but that "their walls are to be adapted to them".<sup>12</sup> In other words, this slight shift in emphasis was designed to undermine the conventional room-by-room analysis and style based decorative conventions, in order to transform the discourse from within.

Although Haweis writing is replete with the taxonomy of a Victorian amateur, and lacks any drawn referent beyond pictorial illustration, she made a shift from the advice writers concern with aesthetic qualities towards a diagrammatic understanding of relationships between body (female) and space (home). The intention it seems was to not decorate in response to any existing architectural ordering devices, but to dress the surrounding environment by unfolding or extending from the body. This general argument was conceptually distinct to practice a century earlier which according to Robin Evans was when "furniture occupies the room and then the figures inhabit the furniture."<sup>13</sup> Such privileging of inanimate forms as spatial and material ordering devices has been expressed by others. Edgar Allen Poe in *Philosophy of Furniture* (1840) remarked that "the soul of the apartment is the carpet... from it are deduced not only the hues but the forms of all objects incumbent."<sup>14</sup>

By the 1920s Dorothy Todd and Raymond Mortimer in *The New Interior Decoration* (1929) again raised the notion that the adorned interior was some form of 'projection.' Following a

quasi anthropological argument they suggested that for prehistoric humans the need to adorn shelters was a powerful impulse, “second only to the desire to adorn our own bodies.”<sup>15</sup> By associating adornment with personality, they concluded like others, that homes were “a projection of ourselves,” and a place where “we see the facets of our character mirrored in the objects with which we have surrounded ourselves.”<sup>16</sup>

Such propositional writing expressed a set of spatial relations through a series of statements that were to some extent ‘thought images’ even though they were yet to be translated through visual thinking. As abstractions they substituted one dominant discourse with another, one that Beverly Gordon identified through a gendered history of the interior, confirming that the nineteenth-century bourgeois interior was one of the few locations available for women’s self-expression; an expression that was categorised as the conceptual conflation of women and interiors.<sup>17</sup> Working diagrammatically Gordon suggested that body and interior space were interchangeable, citing several examples that affirm women’s bodies as an important ornamental factor in decorating a room. She noted that remnants of this conflation metaphor still abound, and that concerns were articulated in a manner that transcended the idea of advice writing *per se*. Other critics such as Debora Silverman writing in *Art Nouveau in Fin-de-Siecle France* (1989) have also observed this, noting that it was Goncourts’ who “clarified how the rococo interior was inseparable from its female identity”.<sup>18</sup>

### **Socio/political diagrams: the new domesticity**

In their seminal publication *The American Woman’s Home* (1869) sisters Catherine Beecher and Harriet Beecher Stow published a drawing titled ‘The Ground Plan of the First Floor’.<sup>19</sup> At first glance it looks like any period plan drawing that is a representation of a building, including dimensions, wall openings and stairs. However, the inclusion of three pieces of furniture and a detailed layout for the kitchen immediately indicates this drawing is different. The overall spatial organisation locates the kitchen opposite the entrance and behind the stair enabling the fireplace flue to occupy the centre of the plan. This diagram is a *haven* strategy, following an idea first put forward by Dolores Hayden as “a model of home as haven, which results in a ‘spatial envelope’”.<sup>20</sup> But whereas Dolores Hayden in her study of American housing observed that “vernacular house forms are economic diagrams of the reproduction of the human race,”<sup>21</sup> this diagram injects a socio/political dimension, in that it instrumentalises architecture.

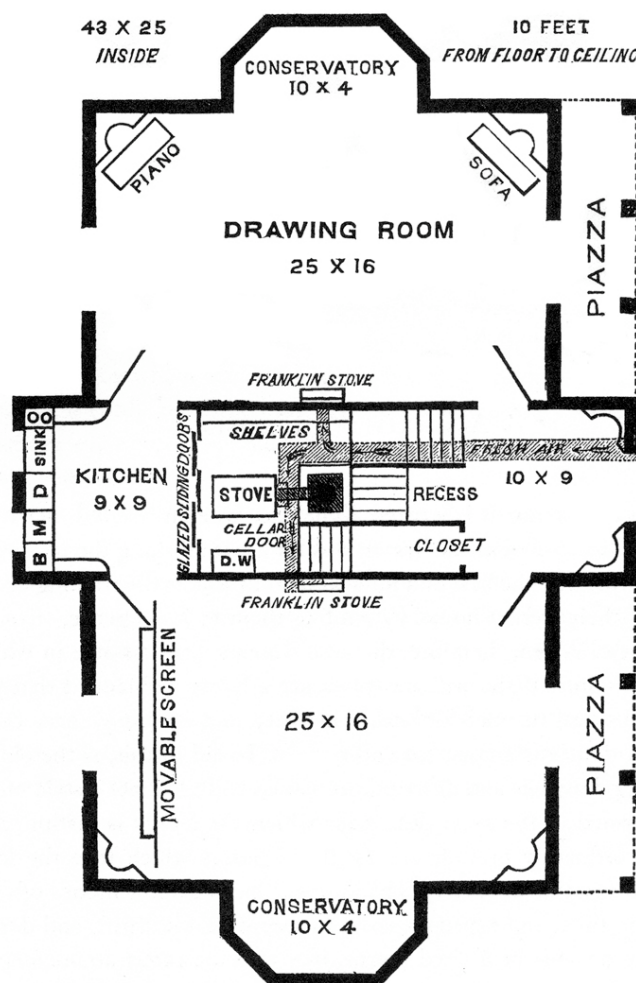


Figure 1: The Ground Plan of the First Floor. Catherine Beecher and Harriet Beecher Stow, *The American Woman's Home*, 1869 p 26. Copyright and courtesy of Mount Holyoak College Archives and Special Collections.

This new geometry of living was presented as “modes of economizing time, labor, and expense by the close packing of conveniences”.<sup>22</sup> To some extent this drawing discloses a ‘spatial politics’ through the intersection of ‘program’ and ‘inhabitation’. Firstly the drawing transforms or disrupts traditionally static horizontal space through the appropriation of lines that define fields of activity as much as resemble conventional proximity indicators. For example a line described as ‘movable screen’ suggests that fluidity of activity is maintained by the repositioning of the ‘wardrobe’ concealing beds and dressing areas. Transcending fixed space this floor-to-ceiling furniture piece indicates a mobile relationship between use and activity. Diagrammed this way, it is a sign that the relationship between interiors and the inhabiting subject is not static and extends beyond loose furniture and accessories. Viewed as a spatial diagram it reaffirms that, “the constantly transforming nature of the domestic interior is such that neither it, nor the identities it represents, can ever be stable.”<sup>23</sup>

Secondly as an advocate of domestic feminism Catherine Beecher’s drawing marked another shift in thinking about the designed interior. As a specific disciplinary device the drawing situates female ‘dominance’ squarely on the home in order to undo or disturb traditional aesthetic ordering devices. In its architectural resolution the ‘diagram’ may be insufficient by

our current understanding of the term. That is, it may (as drawn) resemble a new paradigm for living rather than impart a self-generating or self-organising process, particularly when the diagram is regarded as operating between conventional plan and accompanying text.

Synthesised from early emancipatory claims this account was followed by several more politically motivated means of rethinking the home. Dolores Hayden observed that Melusina Fay Peirce's radical change to domestic organisation included flexible spaces with movable walls, and a description of the requirements for a cooperative housekeeping association.<sup>24</sup> This and other proposals for simplified kitchenless houses are diagrams that register political and social change.<sup>25</sup> They attempt to replace the 'neutral,' objective nature of geometrical descriptions with alternate landscapes in which women's visibility is central. Mediating between words and form, they reframe architecture through progressive economic and egalitarian ideals. To some extent Peirce declares both a social and a disciplinary project, a condition discussed above as 'working diagrammatically'.

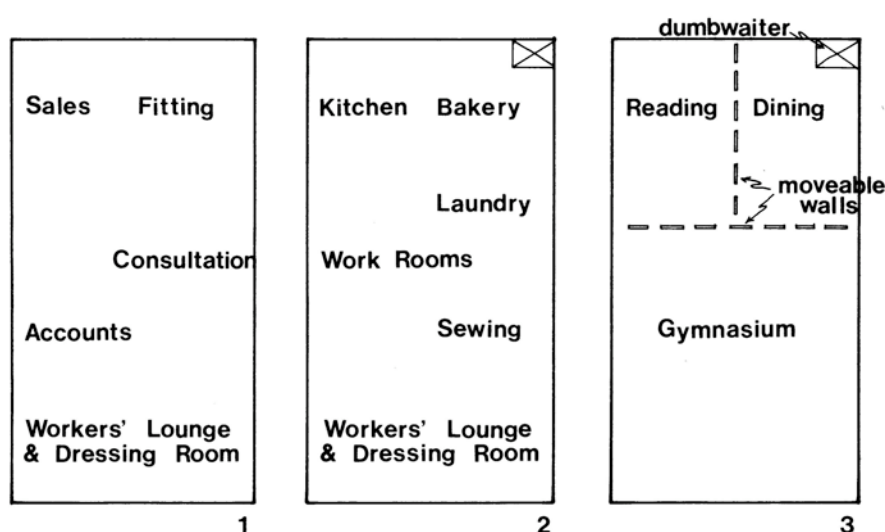


Figure 2: Diagrammatic plan of Melusina Fay Peirce's Cooperative Housekeeping Society, By permission The MIT Press, From Dolores Hayden, *The Grand Domestic Revolution: A History of Feminist Design for American Homes, Neighborhoods, and Cities*, 1981, p 70.

By the early twentieth century some thoughts on spatial organisation repositioned body-centred spatial strategies through ideas of household efficiency and functionality. Extending the earlier work of Melusina Fay Peirce, the self-educated American architect Alice Constance Austin critiques the home as a place that "confiscated" women's labour, regarding it as "stupid" and "inefficient".<sup>26</sup> Like Charlotte Gilman-Perkins, Austin's target was the kitchen, and she "sought to build homes that neutralized the cultural biases that maintained the belief that women were solely responsible for cooking, cleaning, and laundry".<sup>27</sup>

Although unable to take her socialist beliefs into transforming women's lives as Gilman advocated, including the right to work and have families, her housing designs emphasised economy of labour, materials and space. One floor plan proposed for Llano del Rio, California, (1916) placed a patio at the centre, separating the living room from two bedrooms and inter-connecting bathroom. Unlike the Catherine Beecher and Harriet Beecher Stow's plan this



intersection of 'program' and 'inhabitation' resulted in the dining patio at the centre of the courtyard. This spatial diagram recognised the connection of the domestic to city as open, communal and external rather than closed, individual and internal.

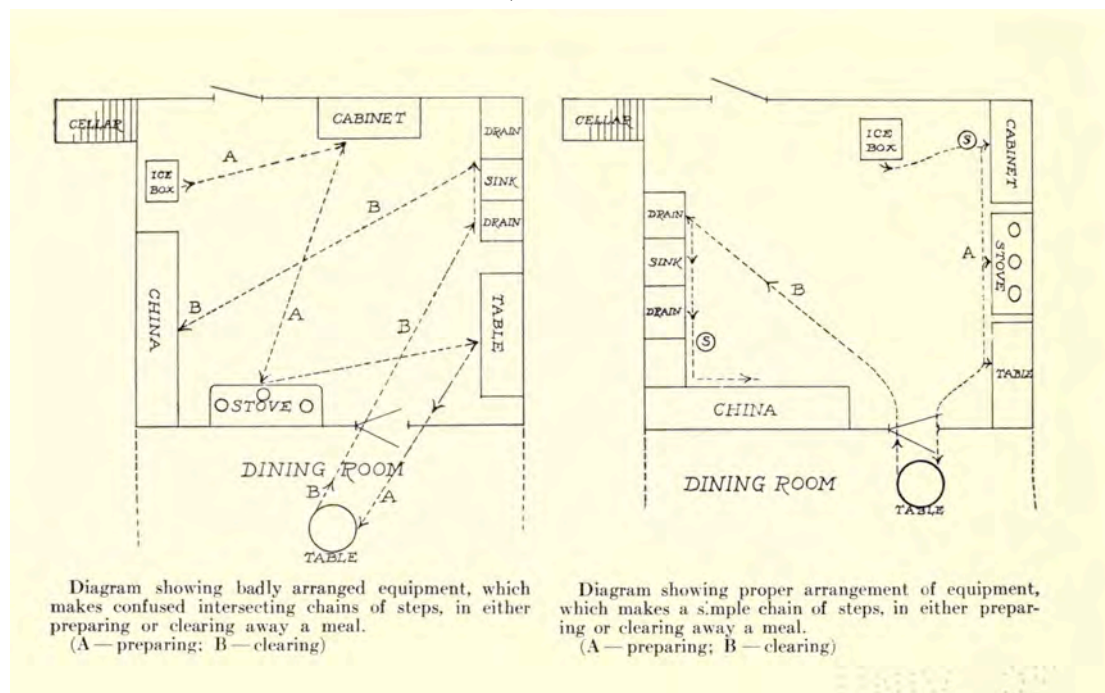


Figure 3: Christine Frederick, *The New Housekeeping*, 1914. Used by permission of Albert R. Mann Library, Cornell University, 2008.

Other proposals for Llano del Rio included food preparation in a central kitchen, and distribution to individual residences through a series of underground tunnels. The spatial politics of Austin's urban intentions, as a form of social engineering, were revealed in a detailed diagrammatic plan influenced by the Arts and Crafts and community planning. As a socialist intent, this gendered diagram of a city was also an attempt to bring domestic activities under scientific management and re-distribute the work activity of labour through efficient organisation.

### Efficiency diagrams: routing and flow

Although much of Austin's critique of domesticity was based on the "hateful monotonous drudgery of preparing 1,095 meals in a year and cleaning up",<sup>28</sup> it was both Christine Frederick and Lillian Gilbreth who constructed a critique of the kitchen through the analyses of operational processes. Frederick, the self-titled 'household efficiency engineer,' simplified kitchen processes to preparation and clearing away. The outcome of her study was that equipment placement was to follow the actual order of work.<sup>29</sup>

In *The New Housekeeping* (1914) Christine Frederick's kitchen analysis was conducted through the 'ideal' way to prepare food, offering a description of the methods involved in making an omelette.<sup>30</sup> Her functional diagrams of the two kitchen processes; preparing and clearing away were represented as 'efficient grouping of kitchen equipment' and 'badly grouped kitchen equipment'.<sup>31</sup> Arrows and lines were used to represent routes, movement and flow, a technique that was in stark contrast to similar representations in her later volume *Household Engineering* (1923), where the original diagram was transposed to resemble a conventional plan drawing.<sup>32</sup> While this work falls under the notion of scientific management of

the home, it and other similar diagrams appeared in many household and architectural magazines. Hyungmin Pai acknowledged the significance of Frederick's circulation diagrams, particularly in Europe where it was grasped by architects such as Bruno Taut, but suggested, "it had little immediate impact on architecture".<sup>33</sup>

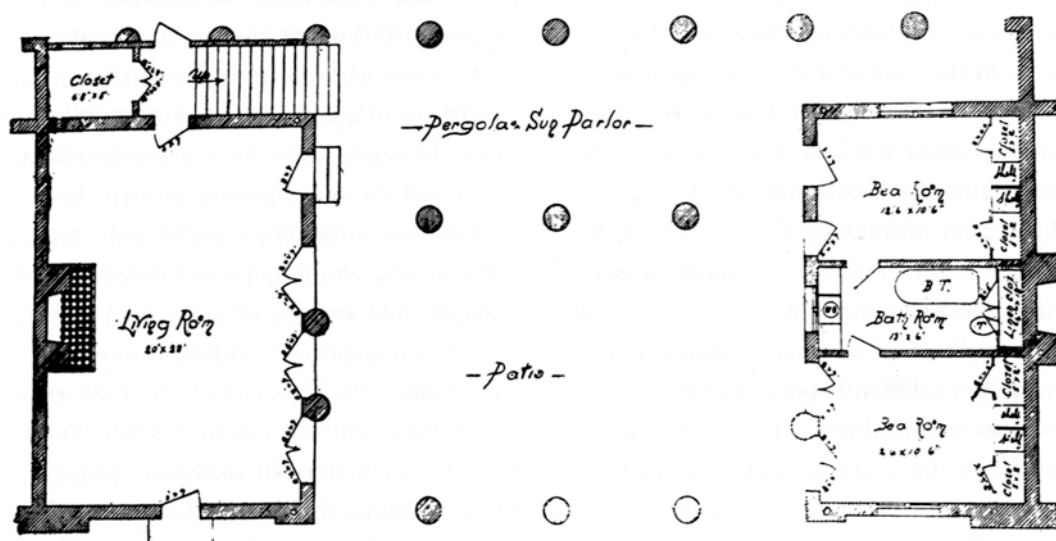


Figure 4: Alice Constance Austin, First floor plan for a kitchenless house at Llano del Rio, California, 1916. By permission The MIT Press, From Dolores Hayden, *The Grand Domestic Revolution: A History of Neighborhoods, and Cities*, 1981, p 244.

Before arriving at her motion study of the kitchen Lillian Gilbreth spent many years in industry analysing human movement into minute divisions of labour, though time-motion studies captured on long-exposure single-frame photographs of a light attached to the body, or industrial instrument. From this work Gilbreth concluded that there were two basic ways of routing, to borrow Pai's summery, planning the movement of material and following the worker's performance of a particular task.<sup>34</sup> Under these studies, human movement became represented by rules, formulae, graphic management charts and diagrams.

Hyungmin Pai argued that there are no routing diagrams in Lillian Gilbreth's contribution to kitchen planning, but she produced 'process charts' for making a cake. Presented in *Architectural Record* (1930) as the 'Application of Motion Study to Kitchen Planning: Making a Cake', each chart was based on the original and improved kitchen layout. Both drawings were included in the article and they note the former requires 50 processes and 143 feet of walking, whereas the latter needs only 24 processes and 24 feet of walking. Pai suggested this form of minute measurement and presentation was distinctly different to Christine Frederick's kitchen 'routing' drawing (1914). However, the measurement of movement (walking) against activity indicates that some form of routing was undertaken if not presented in this diagram.

### Sexual diagrams:

Although much of this writing is concerned with the home and gender identification, questions of sexuality and the interior shift the diagram, raising a different relationship of the body to the interior. For example Lee Edelman's queer theory reading of a public men's room in a fashionable New York bar, recognised Foucault's notion that architecture and sexuality are inextricably linked because architecture houses sexualised beings. Edelman argued that the men's room is an environment that is constructed (made/given rise to) by men's behaviour in



the space, and at the same time cultural/social actions are conditioned by the space itself.<sup>35</sup> He suggested that such spaces are far from any neutral, technological response to bodily necessities, but are designed by, and have designs on men. Though diagrams did not appear in his text, and it is primarily concerned with social and psychological engagement of space, Edelman anticipated changes to the diagramming of body/space relations, particularly as architecture is used to condition space when male sexuality is challenged by cultural norms of sexually specific behaviour.

One design project that contributes to this debate is 'Kens Gym' by Byron Kinnaird and Richard Burns.<sup>36</sup> Initially Kinnaird and Burns attempted to destabilise the conventionality of the male changing room through the study of behaviour and actions conditioned by same sex desire. Diagramming an alternative to the 'neutral' hygienic, functional environment, they responded to particular bodily relations and in Edelman's terms culturally abjected bodily functions. This included a reorganisation of conventional layout such that to enter the shower/display room participants have to step over the 'piss wall' floor drain. Moreover in a bid to challenge the cultural regulation of desire, they produced alternate anthropometric data derived from a study of sexual activity in the men's changing room. Here architecture masculinity and sexuality are interlinked and the functional diagram becomes a sexual diagram.

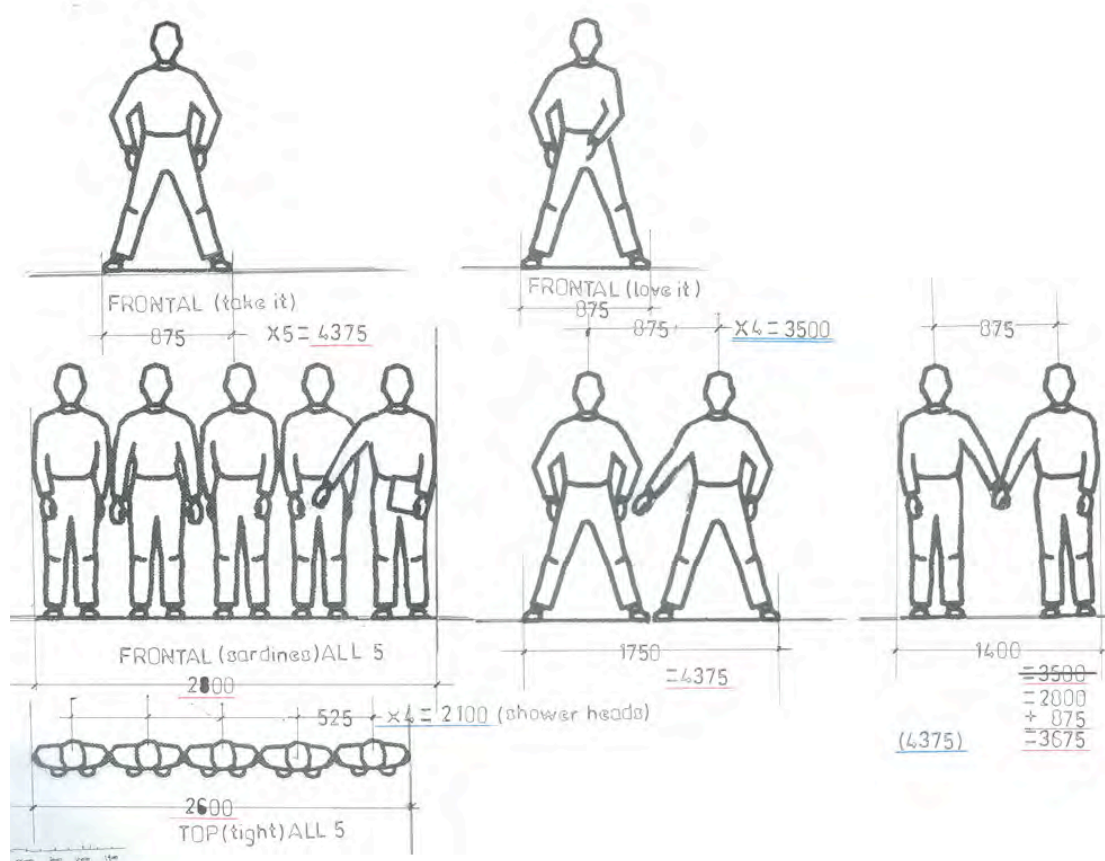


Figure 5: Byron Kinnaird, Frontal Series Test, 2005.

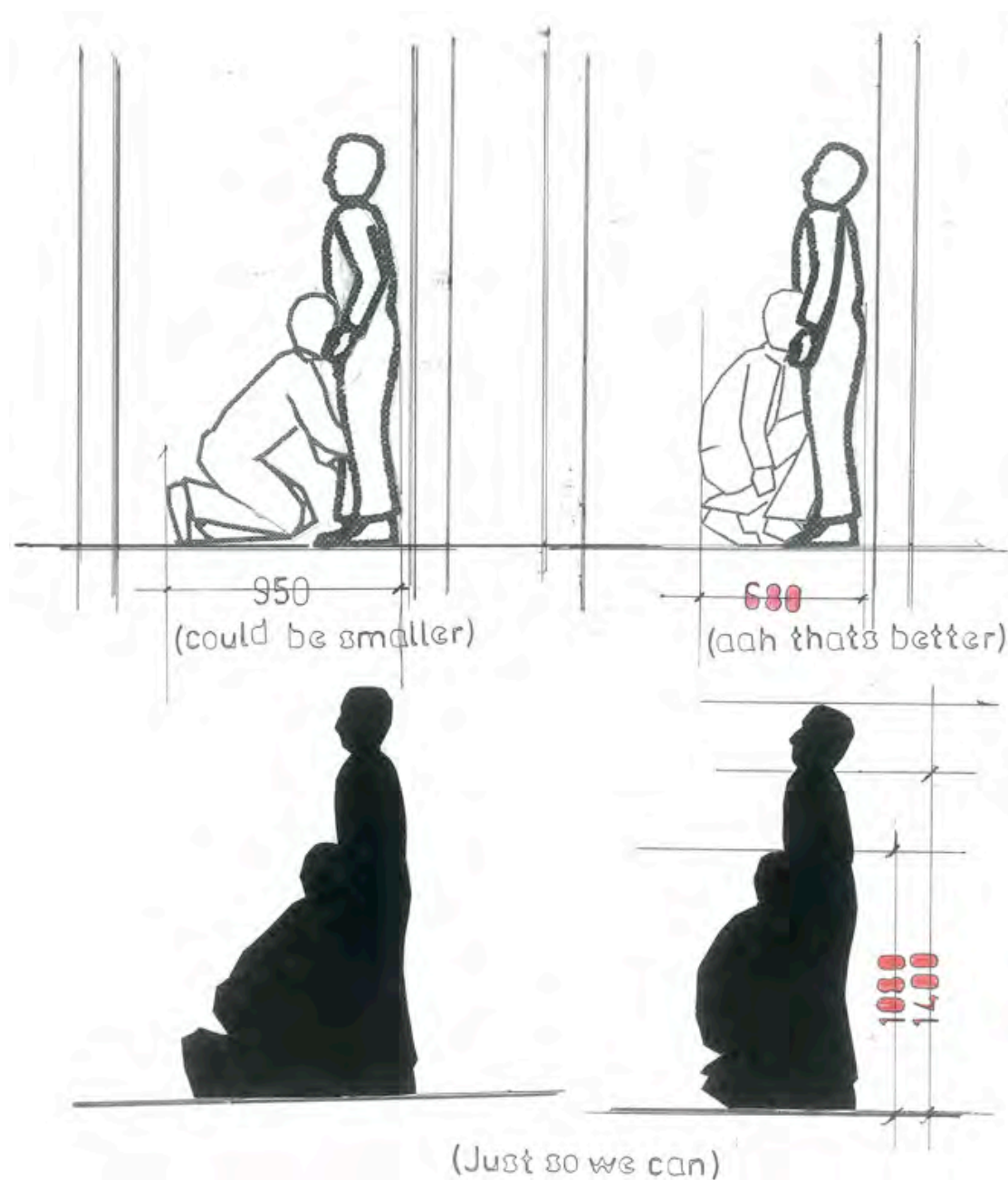


Figure 5a: Byron Kinnaird, Sectional Shower Test, 2005.

**Digital bodies and space:**

More recently digital technologies have allowed increasingly sophisticated spatial renderings, and facilitated three-and four-dimensional modelling that advanced surface as the structuring principle of architecture. Andrew Benjamin writing in *Armed Surfaces* (2004) suggested that Dagmar Richter understands the computer generated surface as a diagram in which the “diagram allows for specific modes of investigation.”<sup>37</sup> Careful to avoid construing the diagram volumetrically, Richter’s contextual models for the Dom-in(f)o House engaged dialectics of inside and outside, structure and surface and so on. However these prototypes are form generational as abstractions, whereas the Full Body Massage suite by Chaney, Randell and Seow diagrams the masseur’s interaction with client, spatialising the dynamics of the activity.<sup>38</sup> In the design process a number of constraints are established, including registering the body’s movement in space during massage, and mapping changes when boundaries extend. The

three-dimensional digital diagram informed by occupational activity defines tolerance volumes and material arrangement, anticipating the sensuality of the semi-naked body and intimacy between form and materials as a dynamic morphology.

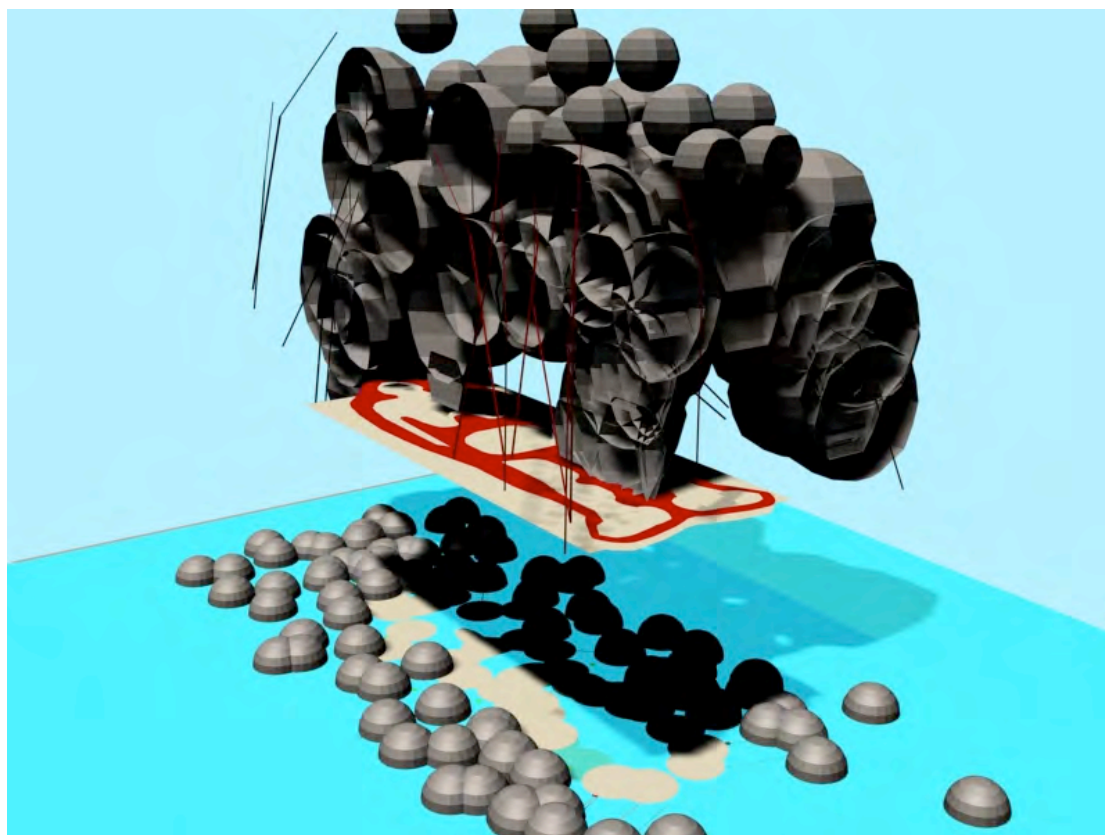


Figure 6: Matthew Randell, 's diagram of the Full Body Massage Suite, 2006

### Conclusion

Part of what is demonstrated here is that by re-distributing functions the diagram, rather than represent concepts and objects external to architecture, retains an instrumental role, resolute with inherent abstract potentials. That is, operationally it reprograms space relative to specific rather than general attributes, opening the interior to investigation in a political, cultural and social sense. With the focus on the gendered, sexed and raced performative body, particular activities, occupations and events provide a data field in which connections supplant traditions, and the diagram's architectural resolution is not its extrusion. Moreover whilst I have focussed on the interior as a spatial extension of the body manifested through material elements, there is disclosed a relationship between the animate and the material, and the diagrammatic and the representational that is particular to the discourse of the interior.

### NOTE:

An earlier version of this paper was first published in Mark Garcia, (2010). *The Diagrams of Architecture*, Chichester, John Wiley. pp 124-131.

## Endnotes

- <sup>1</sup> Pai was referring to Charles Osborne's *Notes on the Art of House Planning*, (1888). Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse and Modernity in America*, Cambs., Mass., MIT Press, 2002, p 177.
- <sup>2</sup> Robert E. Somol, 'Dummy Text, or The Diagrammatic Basis of Contemporary Architecture', in Peter Eisenman, *Diagram Diaries*, New York, Universe Publishing, 1999, p 7.
- <sup>3</sup> Somol, 'Dummy Text', p 7.
- <sup>4</sup> Pai, *Portfolio and the Diagram*, p 164.
- <sup>5</sup> Mark Jackson, Diagram of the Fold, The actuality of virtual architecture, <http://www.international-festival.org/node/28703>
- <sup>6</sup> Somol, 'Dummy Text', p 22.
- <sup>7</sup> Jackson, Diagram of the Fold.
- <sup>8</sup> Somol, 'Dummy Text', p 23.
- <sup>9</sup> Somol, 'Dummy Text', p 23.
- <sup>10</sup> See Mary Haweis, *The Art of Beauty*, London, Chatto and Windus, 1878, and Mary Haweis, *The Art of Decoration*, London, Chatto and Windus, 1881.
- <sup>11</sup> Mary Haweis, *The Art of Beauty*, London, Chatto and Windus, 1878, p 194.
- <sup>12</sup> Mary Haweis, *The Art of Decoration*, London, Chatto and Windus, 1881, p. 23.
- <sup>13</sup> Robin Evans, *Translations from Drawing to Building and Other Essays*, London, Architectural Association, 1997, p 219.
- <sup>14</sup> Edgar Allen Poe, *Philosophy of Furniture*, ReadBook On Line.net, 18 August 2006 <<http://www.readbookonline.net/readOnLine/518/>>
- <sup>15</sup> Dorothy Todd and Raymond Mortimer, *The New Interior Decoration: An Introduction to its Principles, and International Survey of its Methods*, New York, Scribner's, 1929, p. 1. Between 1922 and 1926 Dorothy Todd was the editor of British *Vogue*, to which the literary and art critic Raymond Mortimer was a contributing writer.
- <sup>16</sup> Todd and Mortimer, *New Interior Decoration*, p 1.
- <sup>17</sup> Beverly Gordon, Woman's Domestic Body: the Conceptual Conflation of Women and Interiors in the Industrial Age, *Winterthur Portfolio*, v31, no4, 1996, pp 281–301.
- <sup>18</sup> Debora Silverman, *Art Nouveau in Fin-de-Siecle France: politics, psychology, and style*, Berkeley, University of California Press, 1989, p 29.
- <sup>19</sup> Catharine E. Beecher and Harriet Beecher Stowe, *The American Woman's Home: or Principles of Domestic Science; Being A Guide to the Formation and Maintenance of Economical, Healthful, Beautiful, and Christian Homes*, New York, J. B. Ford and Company, 1869.
- <sup>20</sup> Dolores Hayden, *Redesigning the American Dream: The Future of Housing, Work, and Family Life*, New York; London, Norton, 1984, p 74.
- <sup>21</sup> Dolores Hayden, *Redesigning the American Dream: The Future of Housing, Work, and Family Life*, New York; London, Norton, 1984, p 98.
- <sup>22</sup> Beecher and Beecher Stowe, *American Woman's Home*, p 25.
- <sup>23</sup> Penny Sparke, Introduction, in Susie McKellar and Penny Sparke, (eds.), *Interior Design and Identity*, Manchester, Manchester University Press, 2004, p 2.
- <sup>24</sup> Dolores Hayden, *The Grand Domestic Revolution: a history of feminine designs for American homes, neighbourhoods, and cities*, Cambridge, Mass., MIT Press, 1981, p 69.
- <sup>25</sup> Hayden, *Grand Domestic Revolution*, pp 70-71.
- <sup>26</sup> Hayden, *Grand Domestic Revolution*, p 264.

- <sup>27</sup> David Blanke, *The 1910s, American Popular Culture Through History*, Westport, Greenwood Publishing Group, 2002, p 93.
- <sup>28</sup> Hayden, *Grand Domestic Revolution*, p 243.
- <sup>29</sup> Christine Frederick published the outcome of her studies in several places including *Ladies Home Journal*, 13 September, 20 October, 19 November, and 16 December 1912.
- <sup>30</sup> Christine Frederick, *The New Housekeeping, Efficient Studies in Home Management*, New York, Doubleday, 1914, p 51.
- <sup>31</sup> Frederick, *New Housekeeping*, p 52.
- <sup>32</sup> Christine Frederick, *Household Engineering, Scientific Management in the Home*, Chicago, American School of Home Economics, 1923.
- <sup>33</sup> Pai, *Portfolio and the Diagram*, p 177.
- <sup>34</sup> Pai, *Portfolio and the Diagram*, p 174.
- <sup>35</sup> Lee Edelman, 'Men's Room,' in Joel Sanders, (ed.), *Stud: Architectures of Masculinity*, New York, Princeton Architectural Press, 1996.
- <sup>36</sup> This project was conducted at Victoria University Wellington, New Zealand. Studio Director Mark Taylor. Student Project, Ken' Gym. Students Ken Tang (concept), Byron Kinnaird, Richard Burns (developed design)
- <sup>37</sup> See: Dagmar Richter, *Armed Surfaces*, London, Black Dog Publishing, 2004, p 7.
- <sup>38</sup> This project was conducted at Victoria University Wellington, New Zealand. Studio Directors, Mark Taylor and Mark Burry. Student Project, Full Body Massage Suite.' Students: Yijing-xu (concept), Diana Chaney, Matthew Randell, Yi Wen Seow (developed design).

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