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Mindful Material: Buhrich's Architectural Alchemy

Using ribs of clear acrylic on a chromed steel bar under glass; a red-hot liquid resin bath and room; and spinning precast concrete curving stairs with solid Sydney sandstones melting into air, Hugh Buhrich (1911-2004) made mindful architecture without much money. Extreme economy formed the framework for his crafted Castlecrag constructions, personal labour often his means of materialising thought. In conversations with the author during the early 1990s the architect lamented a lack of funds prohibiting the purchase for his final home of higher quality slate for the living room floor.

Transformation of familiar, inexpensive materials including many off-the-shelf components formed a crucial aspect of that home's highly inventive, now acknowledged architectural contribution. Terse, hard won geometric control coupled with precise technical knowledge and practical know-how were used by the architect in his last house on Edinburgh Road to newly reorient each element. Catalogue aluminium glazing, techniques for fibreglass boat building and re-combined standardised light bulbs were there presented as each unique.

Now heritage listed as a significant modern work, this Sydney 1970s structure on what was then a cheap, small, tight and difficult site is lately precious, financially and culturally. Primary research via a close study of the architect's working drawings, now held in a NSW State Library archive, forms the background to this paper. Focusing on a series of critical drawn and constructed details, charting the relationship in his house between archived documents and physical realisations, Buhrich's architectural alchemy will be studied. Easily invisible, those moments embody imagination and disciplinary knowledge. Following his reframing of re-assembled familiar parts, a close understanding of this unlikely material invigoration can thus be traced. Buhrich's thought in building is toward a direction: almost but not quite, 'searching for the philosopher's stone.'

Working drawings for the Buhrich House in Castlecrag now held in a NSW State Library archive, record embedded design priorities less visible in matter. Primary research via a close study of those artefacts, charting the relationship between drawn documents and realisations, provides important traces of the architect's discrete, directed thought. Building on a prior investigation of those archived materials, this paper extends previous observations of interconnections between Buhrich's drawings and the physical construction.¹ By focusing on a critical series of drawn and built moments, details of his material invigoration can be examined. Easily invisible, those situations embody imagination and disciplinary knowledge. Following his deliberate reframing of re-assembled familiar components, glimpses of Buhrich's architectural alchemy - part of that structure's inventive, now acknowledged radical contribution - can be seen.²

Archived detailed documents form a collection of thirty-five, roughly A2 sized, horizontally oriented and efficiently covered translucent tracing paper sheets.³ Fragmented, partially burnt and with drawings missing from the numbered set, they offer a compressed register of abstract geometric, dimensional and technical information. Rough design sketches, impressionistic images, repetition and rhetoric are absent. Almost mathematical, these details appear to have accurately anticipated realisations. With the exception of an early sketch plan, unusually, for a building designed and built by the same person, very little in this architecture appears to have been reconceived in transition from documentation into physical form.⁴

Coherent conception can be seen here coupled with abstracted drawn distance. Disembodied, oblique representations, Buhrich's delineations contrast with their physical counterparts, suggesting only remotely future specific appearances. Often untitled, undated and unattributed, sheets are not systematically cross-referenced and close familiarity with measured details is frequently required to identify foreshadowed components. Irregular as a working drawing set - after early small scale plans and sections - the documents appear broadly organised as a sequence of detailed dwelling parts, each articulated in material terms.

Foundations, walls, screens and roof are drawn discretely. Documentation indicates each was made in a dominant substance. Material variation divides building components; such distinctions are suggested as elemental. As built, each stands apart. Concrete cast as beams, stairs and platform, dramatically structure a newfound ground. Sandstone walls demarcate a fireplace and dining space. Liquid resin manifests a bath and its room. Aluminium framed glazing delicately screens an open north-face to Sugarloaf Bay while, poised on tiny steel columns, a timber ceiling soars canopy-like overhead. Life in the house is thus positioned between two symbolic stonewalls, refined glass screens, a floating concrete ground, hovering timber roof and a body-formed red bath. Charged material denotes each part of the home.

Parallel ambitions for structural, formal and functional innovation pervade each drafted element. Drawing no. 630/24A 'Roof Details' shows the roof; every framing member is drawn in plan at a scale of one quarter of an inch equals one foot.⁵ Indicated by the sheet's title, detail and larger description were here interconnected. Information invisible in the finished assembly provides insight into this built-in thought. Close to the metric scale of 1:50, the larger dimensional description is unusual for an overall drawing that shows initially a familiar field of regularly spaced members, the majority oriented vertically and repeated along a horizontal rectangular volume. Depicting an apparently conventionally framed timber roof, the top of the page is occupied with a larger scaled elevation of a carefully delineated timber truss.

At the time standard and inexpensive, both the truss and lightweight frame described in drawing no. 630/24A were discussed in the popular press as affordable technologies for home roof manufacture. Titled "Big Developments From Research", an article by Eva Buhrich described as a "Roofing Feature" published nine years earlier in the *Sydney Morning Herald*, had outlined a number of available techniques, highlighting the economic advantages of wood for domestic situations:

Timber is still the most economical material for small buildings. In traditional construction, the timber roof is assembled on the job from struts, purlins, rafters and other members. A more modern development is the light-timber truss which is prefabricated and spans across the whole building so that intermediate walls are non-structural.⁶

Married to Hugh, Eva had trained with him as an architect in Germany and collaborated on many projects, indicated by her initials on numerous sheets in the drawing archive.⁷

Nominally simple, lightweight and organised as traditional timber construction, closer inspection of 'Roof Details' reveals a much more unusual hybrid ensemble. Load bearing brick as well as timber wall fragments shift span dimensions as well as spacing in the recurring field. External structural concrete walls at the entrance and eastern facades, together with steel angles, beams and fine steel column 'staunches' throughout the framework significantly complicate the conception. Clearly customised shallow timber trusses further interrupt the system to span larger areas. Framing members in the westernmost rooms are rotated ninety degrees to span broadly east west. Sizes of repeated single members vary from 6x2, 6x3, 8x2 to 12x3 (inches). Each framing element was clearly particularised by Buhrich to optimise lightness, strength and ease of assembly.

Disruption within the system is most explicit at the entry area via shifted angular and radial plan geometry. Indicating a resultant interference pattern in between repetitive fields, the framing for this moment manifests a drawn, otherwise unforeseen intersection of different spatial, structural, material and geometric systems. Between the public and more private dwelling areas, the unusually complex space symbolically distinguishes inside and out.

In many senses, economy of means can be seen as an evident priority. A series of alphabetically labelled north-south sections A through H and east-west sections P, Q, R and S on this plan allow one to observe unusual variety in section across this ostensibly conventional structure. Revealed is an overall ceiling and roof profile that is: inexpensive as a system; light, logical and systematic; and in parallel spatially and structurally highly inventive. Evenly spaced shallow triangulated timber trusses efficiently span across the kitchen, living and dining room to frame a roof wedge that is narrowest in profile at the northern façade. Along this water facing edge the ceiling is almost flat, transforming gradually in profile to become a repeating sine curve at its parallel southern face. Truss centrelines locate the base of each curve with each high crest maximising ceiling space between truss supports. Hybrid structurally and as a form, repeated curved gables shape the street façade whilst a flat roof faces the harbour and horizon. Lyrical spatially, the solution was in parallel practical, optimising living space within external height restrictions and satisfying minimum ceiling height limits for elevated habitable kitchen and dining zones.

Supported by a steel beam spanning the living room's northern edge, the mostly timber roof is held aloft by tiny steel columns invisible in anodised aluminium casing. Circular steel 'staunches' at the south-facing wall miraculously bear this weight, the column slenderness made possible by the optimised minimal frame. Faced with Western Red Cedar, the floating ceiling evokes something heavier and solid overhead. Physically present timber, held by implausibly fine supports, creates a sense of poised, provisional stability. Aligned lightness is evoked by the ceiling's curvilinear geometry; cedar strips form a series of moving, predominantly horizontal lines that complicate an easy image of loadbearing weight. Geometrically ambitious, this elemental timber roof can be seen via its documentation as doubly pragmatic and economically conceived. Architecturally also unique, invention here was critically tied to material optimisation within numerous required performative limits.

In powerful contrast with Buhrich's natural timber ceiling, a bright red-hot resin bathroom provided an alternate building component with parallel elemental properties. Curvilinear movement with an implied liquidity described a bath, basin, floor, ceiling and walls, all materially continuous and seamlessly made as a single cast. Corporeal colour shockingly evoked both an interior and private room; functional arrangements further created an exterior. Opening entirely onto an aspect overlooking Sydney Harbour - a single glass sheet sliding away - one might shower almost outside. Freedom of organisation implied in the fluidity connected each user to the pleasures of bathing, floating within and above water and amongst a canopy of native trees. Steam and water within the body as well as in basin, bath and harbour were suggested as interconnected and explored via controlled geometry in structured substance.

Organisation of this built-in room was one of the few aspects of the architect's house to visibly evolve. Archived documents trace subtle shifts in design conception. Drawing no. 630/5, titled 'Sketch Plan 3', and dated 18 May 1971, describes an early version of this room with all functional components arranged orthogonally.⁸ An almost square

shower forms an enlarged object at the northern end of a bath parallel with its adjacent wall. Dated 9 June 1971, and titled 'Working Drawing 630/6(A)', similar plan arrangements are indicated with the shower removed. Instead of an object, open space accommodates the use.⁹

Angled geometry emerged in an undated larger part plan drawing no. 630/9, with the bath shifted on axis to face the entrance from a separate toilet.¹⁰ Though tightly interlocked with the bath geometry, the basin was still located at right angles to its adjacent wall. Manifest was a greater dynamism with more generous spatial arrangements. Instead of a corridor alongside the bath, that area was angled to create a significantly larger shower void. Apparent in this detailed image was a projected assembly that imagined bath and basin melting into the room's lining; curves clearly denote this planned connection. Finally developed relationships are articulated in a presumably later drawing at the close scale of one-quarter-life size.¹¹ Absent from the archive set and dated October 1972, it was published in 1991.¹² The basin location is there drawn as further rotated, its axis ultimately between that of the wall and bath. Describing the whole ensemble via a meticulous series of contours, the measured drawn detail methodically documents a component curved in multiple directions.

Manifesting this dynamic space with its integral utilities was clearly complex; an indicated series of sections through both basin and bath formed a precisely measured network of provisional datum lines through which this thought was transcribed into matter. Buhrich's background in boat manufacture was relevant. Interested in sailing, he had previously designed and made an experimental yacht with a hybrid keel; a catamaran-like double hull transformed into a single hull at the other end.¹³ Working on his bath and room in timber and fibreglass, both drawing technique and construction materials echo boat manufacture modes whereby a closely cut drawn sequence of sections can delineate doubly curved surfaces. Employed by the architect to describe his bathroom as well as the aforementioned cedar ceiling, techniques considered typical in sailboat manufacture were reapplied in the context of a home. Extensive personal labour made this process affordable.

Explicitly constructed, the shiny red room suggested a world both of the future and "plastics" coupled with an image of bathing elements emerging from their substrate as if waves frozen up from an ocean.¹⁴ Highly experimental in this context, the coloured substance posed a powerful contrast to the natural surrounding world that in numerous alternate ways it celebrated. Almost also mechanical, a capacity to render all bathroom facilities from one primal liquid was together implied; suggested transmutation was here realised via boat building know-how and material control.

Re-contextualization of provisionally standard assembly components and techniques was characteristic in this project. An inventive bathroom light was proposed by combining two off-the-shelf bulbs; one smaller fixture was located inside another. Visible in the construction documents is a process whereby each part was developed in tight relation to material limits; structural capacities were pushed to extremes. Here particularised as unusually delicate, inexpensive anodised stock aluminium sections were used to frame each glazed screen. Drawing no. 630/33 titled 'Window details water side and balcony' offers insight into an apparently ordinary glass wall.¹⁵ Drawn in elevation at roughly 1:50, half full-sized plan details described construction of the entire façade. Each junction was clearly re-thought; material use was explicitly minimised.

Common catalogue elements were recombined by Buhrich to offer an unexpectedly fine operable floor to ceiling glazing system. Together with interrupting bedroom walls, just four 60mm diameter steel 'stauncheons' structurally supported the entire north wall.¹⁶ Intermittent slender enclosures, formed from standard aluminium sections, concealed those columns. As built, as these were easily mistaken for glazing frames, there appeared to be almost no structure. Fine jambs were individually adjusted to minimise each frame dimension. Many were less than one-inch wide. Just two sliding tracks were typically employed; a standard fixed plus moving pane with layout variation offering a sense that the system could slide away. Economical financially and via material use, the total external membrane thickness measured only 3 inches, approximately 75mm. Off-the-shelf components were consistently modified to manifest unusual aspects such as an angled door and trapezoid glazed opening ingeniously constructed with standard profiles.¹⁷ Via a sequence of three short sections a custom sloping door head is shown as "cut from stock 4½" section,"¹⁸ thus very cheaply made. As built, these drawn adjustments to the economical aluminium appear almost invisible; an unusually refined lightness is present in the building element.

At ninety degrees, and in extreme material counterpoint to this delicate glass screen, Buhrich placed two significant walls of rough-hewn sandstone. Carved from the site, they appeared to ground the home in its locale in the manner of foundations, yet on examination, these solid stones were located in air. Architectural sections show their suspension

high above the earth, held by significant concrete beams.¹⁹ Reassuring as a substance, they performed no structural role. Surrounded by light and air and open-ended, these freestanding walls located the eastern living zones. One formed a substantial chimney and fireplace, the other a window with an attached floating glass table. Thickened symbolic rather than structural frames for living and dining, the sandstone here shaped living situations such as sitting near a fire or sharing a meal.

Available material and personal labour were the modest means in which these elements were manifested. Relevantly located in Castlecrag, the house was within a Sydney suburb imagined and established by architect Walter Burley Griffin in the 1920s.²⁰ Locally quarried sandstone had been a building wall standard for early inexpensive homes in that development, and Griffin's legacy remained present; part of Buhrich's tight site was occupied by a small Griffin designed structure. On-site stone was quarried and assembled by the architect, reimagined in drawings as non-load bearing. Arising from the ground, sandstone was reoriented to float in plan and section as significant fragments.²¹ Supported by an external concrete skin, the rock was given a perceived lightness; an ingredient of the earth could be seen now associated with air. Extending Griffin's site quarried system, these suggestively foundational and 'floating' stones might be used for many things. In parallel with the construction of all bathing utilities from a primal liquid, transmutation of elemental matter in association with fire, water, earth and air was collectively evoked in this architecture.

Earthen surrounds to a fire, held in air, were mimed in the parallel stonewall for dining where a glass opening with no expressed frame was extended horizontally as a table, suspended as a pane with a polished edge. Supported by ribs of clear acrylic on a floating chromed bar under the glass, each individually familiar material was distinguished; transparency and lightness collectively stressed. Reflective, translucent, mirror-like, clear and apparently floating, each part evoked something more immaterial. Meals were thus collected around a pool of reflections, pieces of sky and tree fragments, around an apparent space aligned with the window rather than a solid piece of furniture. Sandstone as a frame reinforced the materially-invoked void.

Rough reinforced concrete, cast by the architect, was used to create external wall elements, a significant spiral stair and a hovering horizontal floor plate for his house. Huge beams supporting this new upper ground formed a cantilevered platform extending north and south from a narrow lower frame accommodated by the precarious slope. Tenuously wedged into a technically possible area, the strategic approach appears found in-between controlling conditions such as planning setbacks, an existing retaining wall, and available land.²² In part, the building's geometry and unexpected expression can be seen as frugal optimisation of the site area within the fraught triangular plot. Cantilevered concrete, earth-like but suspended, made this possible and gave the substantial structure a delicate counterbalanced stability.

Investment in the highly specific nature of concrete in this home is explicit in an early sheet in the archived set describing a significant beam. Hovering over the ground, it supports the main street-facing wall. Sheet no. 630/8, titled 'Details Beam 1', presents eight drafted depictions of this component with detailed attention given to the concrete profile and steel within.²³ Drafted at large scales, all reinforcing rods considering bar strength, frequency, shape and connection type, were evidently precisely adjusted.²⁴ Aligned with the material minimisation of the timber roof, a nominally prosaic building part - typically diagrammed in engineer's plans - can be seen here as architecturally critical. Steel in this concrete is no simple tensile fibre mesh. Consistent with the reduction of columns in aluminium glazing frames, no reinforcing bar was structurally redundant. Legible in drawing is Buhrich's technical know-how and disciplinary understanding. Highly optimised, this tense web of tiny steel members offers insight into the unusual daring of this otherwise background beam.

Through imagination and accurate technique, explicitly explored here was solid matter suspended in air. In the distinctive southern façade, beneath a curvilinear hovering roof, horizontal concrete beams were located in clear glass surrounds. With no apparent support, these held, in turn, an extended wooden frieze: repeated vertical brown slats punctuated by a grid of circular holes. Each piece was vigorously material and yet all matter appeared to float. Just inside the frameless glass, two tiny steel columns miraculously held the entire ensemble together with the roof. In a rare contemporaneous published article on Buhrich's home, this aspect was highlighted: "Another striking feature is the front wall of the dining area and kitchen which appears to have two massive concrete beams 'floating' in glass. In fact the beams are structural and (are) supported by steel columns."²⁵ In an initial impression of the building, this façade floats over the ground, bearing on the cantilevered 'Beam 1.'²⁶ Foreshadowing the house as a whole, each element is clearly distinct. All are materially present yet all are almost magically transformed; the massive concrete, timber and glass assemblage appears to defy gravity.

Built aspects are all precariously balanced; crucial moments throughout this work explore a structure stretched to extremes. Drily recorded in construction documentation, concrete use was critical; its capacity for mass and tensile strength doubly optimised. On the home's eastern edge, a singular external column constructed as a spiral stair manifested both aspects. Abstracted, geometric analysis and technical, dimensional knowledge required for this stair's manufacture can be seen in working drawings.²⁷ Designed and made by the architect, the structure was a series of precast individual cantilevered horizontal steps, fused compressively into a supporting column. Spinning, the curvilinear stair carried both weight and users down; simultaneously, each tensile tread stretched out into the landscape. Gravity coupled with lightness was posed in dynamic tension; this stair was characteristic of each developed building part.

Under extremes, with limited funds and via substantial personal labour, Buhrich's house formed a taut transmutation of available circumstances. Densely layered, each significant component was conceived elementally, in importantly optimised and doubly hybrid material. Every structural moment contained critical questions, materially posed. An element here could seem to question itself. Traditional timber roof framing was radically thus reimagined, its curving wood ceiling both present and yet radically light, newly 'in-flight.' Liquid primal origins were evoked in a red bath. Cheap catalogue aluminium sections were re-found as refined. Site quarried sandstone manifested suspended symbolic walls; rocks framing a fire might no longer form foundations; everything is solid but also melts into air. Tracing Buhrich's thinking through his drawings, unique final forms can be seen as apparently inevitable, arrived from highly particularised, almost but not quite, standard technique. Each element was transformed through drawn discipline and technical knowledge. Architectural alchemy was in this home practically grounded, yet suggested a search for 'philosophical' foundations, in part by transfiguration of as-found stones.

Endnotes

- 1 Catherine Lassen, "Drawn translations: toward and beyond Buhrich's building," in *Translation, Proceedings of the Society of Architectural Historians, Australia and New Zealand 31*, ed. Christoph Schnoor, (SAHANZ, Unitec, Auckland, New Zealand, 2014), 495-504.
- 2 "Though the author of a truly radical building, Buhrich is a discrete personality ..." See Françoise Fromonot, "Numéro spécial Australie," *l'Architecture d'Aujourd'hui*, 285 (February 1993): 118.
- 3 Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 4 Sketch plan 630/5 shows slight differences from the final configuration. Entrance geometry and direction were subsequently revised together with a kitchen window later removed but then oriented toward the street. An alternate wall/window organisation framed the dining area. Cellar stairs were then spiral and the plan shows no continuous northern balcony. Bathroom utilities are drawn, as in later working drawings, as an orthogonal arrangement. Attribution appears to be to Buhrich's assistant Bill Chambers. 'Drawn: BC 18.5.71' is in the title block. Drawing 630/5 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 5 'Drawn: BC 10.6.72' is in the title block. Drawing 630/24A in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 6 E. M. (Eva) Buhrich, "Big Developments From Research," *Sydney Morning Herald*, 2 July 1963, 16.
- 7 Eva's initials appear on a wide range of projects including design drawings for the couple's first house at 315 Edinburgh Road Castlecrag but not on any of the working drawings for the later house at no. 375 further up the street. An early article published on that project mentions Eva's participation: "Mrs Buhrich, who is also an architect, was involved with designing the kitchen." No identified author, "An Architect Builds His Ideal house," *Australian House and Garden* (January 1976): 130.
- 8 Drawing 630/5 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 9 Drawing 630/6 (A) in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 10 Title block shows no attribution, no title and no date. Drawing is clearly accurately drafted to a scale that appears to be $\frac{1}{2}" = 1'-0"$ although no scale is indicated. Drawing 630/9 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.

- 11 Shown on the drawing as 3" = 1'- 0." Drawing 630/37, a cropped part of which is published in, Neil Durbach and Catherine Lassen, *House: Hugh Buhrich 1972* (Sydney: Garry Anderson Gallery, 1991), np.
- 12 Durbach and Lassen, *House: Hugh Buhrich 1972*, np.
- 13 Neil Buhrich, Hugh and Eva's sole surviving son, conversation with the author, January 2014. Photographs of this boat are in family albums, Private Collection, Neil Buhrich.
- 14 " 'plastics,' the post-utopian, one-word treatise uttered at a nondescript backyard party in the 1967 film *The Graduate*." See Sandy Isenstadt, "Recurring Surfaces: Architecture in the Experience Economy," *Perspecta 32: Resurfacing Modernism*, eds. AnnMarie Brennan and Brendan D. Moran (Cambridge, MA: MIT Press, 2001), 110.
- 15 Scales indicated are ¼" = 1'-0" and ½ full scale. Drawing 630/33 in Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 16 Buhrich had earlier indicated more columns in this façade. Drawing 630/9, a part plan, shows narrow steel columns at the end of each bedroom and bathroom wall. Two of these have been removed in the sheet detailing the northern glazed façade, clearly noted as 'no stauncheon' in those expected column locations. Drawings 630/9 and 630/33 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 17 'Drawn: BC 20.7.72' is in the title block. Drawing 630/35 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 18 Construction note on Drawing 630/35 in Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 19 Drawing 630/7 in Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 20 "Civilized man has never had a greater opportunity to find his home in the midst of a natural paradise than that offered him right in the Australian metropolis." See W. B. Griffin, "Picturesque Waterside Suburb," *Australian Home Builder* (August 1922) in Donald Leslie Johnson, *The Architecture of Walter Burley Griffin* (Melbourne: Macmillan, 1977), 80.
- 21 Drawings 630/6 and 630/7 plan and section blueprints, coloured to show material distinctions, Private Collection, Neil Buhrich.
- 22 Visible on, Drawings 630/6 and 630/7 plan and section blueprints, coloured to show material distinctions, Private Collection, Neil Buhrich.
- 23 Drawing 630/8 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 24 1" = 1'-0" and ½" = 1'-0" are the two scales indicated. Drawing 630/8 in, Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 25 No identified author, "An Architect Builds His Ideal House," *Australian House and Garden*, (January 1976): 52.
- 26 Drawing 630/8 in Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.
- 27 Drawing 630/11 in Hugh Buhrich - collection of architectural and design plans, ca. 1940-1988, SLNSW Mitchell Library Drawing Archives, PXD970, nos. 630-648.