

6. The Origins of Form: Grounds, Bischoff and the Frankel House

The Frankel House, at 4 Cobby Street, Campbell, was designed by Grounds in 1969 and realised by the same team that produced the Gascoigne House: Bischoff, who worked closely with the Frankels to develop the design and prepare contract documents from late 1969 to early 1970, and Roetzer, who constructed the house during 1971 and 1972. This was the third architect-designed house commissioned by the Frankels, and the second in Canberra. The first house, in Christchurch, New Zealand, was designed by Ernst Plischke, while the second, designed by Oscar Bayne, was adjacent to the CSIRO at 40 Nicholson Crescent, Acton.

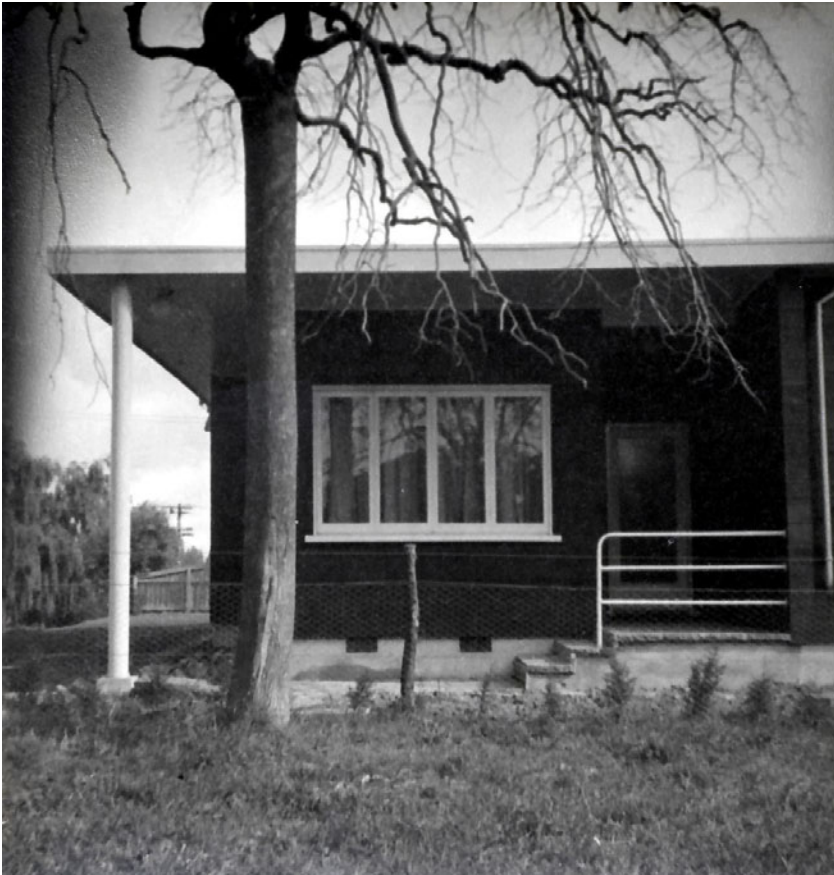


Figure 6.1 Frankel House, Opawa, Christchurch, c. 1940

Photograph: Manuscript Collection, Adolph Basser Library, Australian Academy of Science. Frankel, Sir O. H., FAA (1900–2007), MS 106, Box 13



Figure 6.2 Frankel House, Cobby Street, Campbell, view from south-west

Photograph: Ben Wrigley, 2011

When the National Capital Development Commission (NCDC) decided to widen Nicholson Crescent to form part of Barry Drive—a major new road intended to connect the expanding suburbs of Belconnen to the city centre—one obstacle stood in their way: the Frankels' first Canberra House.¹ This was not so much a physical impediment as a political one: Otto—already 'Sir Otto'—and Margaret had significant clout. Not wanting to become embroiled in a drawnout battle, officers of the NCDC offered the Frankels an alternative building site in Campbell in return for their undertaking to vacate Nicholson Crescent.² But it was not just any site that they offered the Frankels; in Otto's words, it was

quite unlike anything a normal citizen could aspire to...It is three-quarters of an acre on a very favoured and secluded site in a prestige area in Campbell and we are able to select our particular site...it is rather dramatic with a view of mountains and lake and bushland.³

1 In 1958 Frankel discussed the road widening with Ruddock, Associate Commissioner and former member of Coombs' Department of Post-War Reconstruction, and Grounds, who was site architect for the CSIRO. The original road alignment, which they marked up on a site plan, would not have affected the Frankels' house.

2 The Frankels enjoyed living in the Nicholson Crescent house, and put a lot of work into the gardens. They initially considered staying in the house and fighting the NCDC, but decided that it would be in their best interests to cooperate. The NCDC gave the Frankels an undertaking that they could occupy the Nicholson Crescent house until the new one was available. Frankel, Sir O. H., FAA (1900–1998), Manuscript Collection, Adolph Basser Library, Australian Academy of Science, Canberra, MS 106, Box 13, Item C.

3 Otto Frankel to Roy Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

In mid-1968, when Frankel asked Grounds to design his house, both men had received knighthoods and were in the twilight of their careers. Although Frankel was involved in many professional activities—both within Australia and overseas—he had been retired from the CSIRO for two years.⁴ Because Grounds was fully committed to the Victorian Arts Centre and National Gallery projects, Frankel was not sure if he would accept the commission.⁵ So he began his request in such a way that the architect could hardly have refused: ‘There is nothing we would wish better than for a house designed by you’, he wrote. Frankel explained how he and Margaret should have commissioned Grounds for their existing house in Nicholson Crescent. He disclosed how Bayne had confided to him that he regretted not recommending Grounds back in 1953, and felt that his own design was ‘too unadventurous’. (Frankel did not know Grounds in 1953; that was before the Academy of Science building.)



Figure 6.3 Frankel House, Nicholson Crescent, Acton, 1955

Photograph: National Archives of Australia. NAA: A1200, L19496

Believing that praise would get him everywhere, Frankel continued:

But genius apart, which we take for granted, with no-one else, would we be so sure of intrinsic quality of design and thoughtfulness of detail. Besides, you know us so well that we would scarcely have to use more

4 Frankel was Vice-President of the International Biological Program (IBP).

5 In 1966 Grounds designed a house in Canberra for the plant physiologist Sir Rutherford Robertson, which was not built. The only other domestic projects that he appeared to be involved with at this stage of his career were the M. A. Nicholas House at 22 Hill Street, Toorak (near his own house), and the Ken Myer holiday house and Kraal structure at Penders, in southern New South Wales. Conrad Hamann, *Modern Architecture in Melbourne: The Architecture of Grounds, Romberg and Boyd, 1927–1971* (PhD dissertation, Visual Arts Department, Monash University, 1978), vol. 2, Bibliography and Catalogue, Part II, Grounds, 66–9.

than shorthand in conveying our own ideas; and I believe that both parties would enjoy the collaboration as of course we did on earlier occasions.⁶

Buoyed by Grounds' initial response—'I'd be a bastard to say no'⁷—but aware of the architect's other commitments, Frankel offered a compromise. He was prepared to permit others in Grounds' office to carry out the details, so long as Grounds was the major contributor. But just in case there was any doubt as to what level of commitment he expected, Frankel added: 'the burden on you would be there and this has to be reckoned with by both parties.' And there was yet another condition: to prevent the Frankels from having to move house twice, the design drawings were required urgently.⁸

On one level, it is a wonder that Grounds accepted the invitation. After all, he was based in Melbourne and was fully committed to a major architectural project. Given that Frankel was aware of this, it is surprising that he bothered to ask Grounds. There was no shortage of available architects in Canberra at the time: officers of the NCDC—which, by the late 1960s, had seized control of the design and construction industry in Canberra—had advised Frankel that they could 'bring an element of pressure to bear on Canberra architects, most of whom they employ in one way or another', to obtain a house design for him at short notice.⁹

But none of this takes into account one overriding factor: the close professional and personal relationship that had developed between Frankel and Grounds. It was a friendship that had been nurtured through the design and construction of the Australian Academy of Science building in the late 1950s, and had developed through the Phytotron project. Although they came from different countries and professions, they had much in common—not the least of which was a shared interest in conservation of the natural environment. Frankel's area of expertise was the conservation of genetic plant resources, which were becoming increasingly depleted through development. He addressed a UN committee on genetic conservation, and was instrumental in founding an international 'genetic bank' of plant gene pools, through which plant breeders contributed to the collection, conservation and exchange of rare specimens.¹⁰

Grounds believed that he inherited his interest in conservation through his association with Frankel and his colleagues. He claimed to have 'got very close

6 Frankel to Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

7 Ibid.; Frankel to C. H. Davis, Acting Assistant Secretary (Land Administration), Department of the Interior, 29 June 1970, Frankel, Sir O. H., FAA (1900–1998), 13/C; Lloyd Evans, Handwritten notes, 27 June 1990, Frankel, Sir O. H., FAA (1900–1998), 15/E, 114 (p. 2, point 5).

8 Frankel to Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

9 Ibid.

10 'Interview—A Scientist in Stockholm', *Australian Country* (June 1968): 40; *Coresearch* [CSIRO newsletter] 161 (August 1972).

to nature through the scientists of the Academy of Science', and in the last 15 years of his life spent much of his spare time returning the flora of Penders, on the NSW South Coast, to its natural state.¹¹

Personal qualities shared by Frankel and his architect included supreme confidence in their own judgment and an uncompromising determination to pursue their goals. Both saw themselves as pragmatists, and both had agrarian connections. Frankel liked to portray himself as a practical person who had become an agriculturalist due to his mother's background. A farming family from Galicia—'the Austrian part of Poland'—they had given him his 'peasant instincts', he claimed.¹² Grounds, who also prided himself on his practicality, could claim an even stronger connection to the land, having spent two years working as an orchardist and dairy farmer in country Victoria.¹³

So significant was the alliance established between these two that not only did Grounds accept the commission; he promised to do it for free.¹⁴ But there were other reasons why he agreed. In Canberra, he had an excellent accomplice in Bischoff, who had worked on a number of previous Grounds, Romberg and Boyd projects. There was also the question of convenience: Bischoff's office—which he shared with John Scollay and Anthony Pegrum—was located in the townhouses that Grounds had designed on the corner of Tasmania Circle and Arthur Circle, Forrest, and where he retained an apartment as a Canberra *pied-à-terre*.¹⁵

The Origins of Form

[Otto] had a very attractive French nursemaid, who took him for a walk in the park every afternoon. On one occasion, a young man turned up, gave Otto a pink sugar mouse to suck quietly on the park bench, and then whisked the maid behind the bushes. But Otto finished the mouse too soon, and when he found out what was going on, he decided that he too must become a geneticist.

— Lloyd Evans, speech on Frankel's eightieth birthday, 4 November 1980¹⁶

11 Roy Grounds, De Berg Tapes, National Library of Australia, Recorded in Melbourne, 11 October 1971.

12 Lloyd Evans, 'Otto Herzberg Frankel, 4.11.0–', Frankel, Sir O. H., FAA (1900–1998), 12/A. But, as Evans stated, Frankel was 'some peasant!' Evans's speech at Otto Frankel's eightieth birthday celebration, 4 November 1980, Frankel, Sir O. H., FAA (1900–1998), 12/A, 1.

13 Hamann, *Modern Architecture in Melbourne: The Architecture of Grounds, Romberg and Boyd*, 1927–1971, vol. 1, 45.

14 Grounds to Theo Bischoff, 13 February 1970, Bischoff, Theo, ACT Heritage Library, Woden, Canberra, HMSS 0159, Box 5, 'Frankel House, Campbell', File 2/2.

15 Otto Frankel, 'Sir Roy Grounds, 1905–1981', *Historical Records of Australian Science* 5, no. 3 (1982): 89–91.

16 Frankel, Sir O. H., FAA (1900–1998), 12/A, 1–2.

So what was it about Grounds' architecture that had Frankel so clearly hooked, so keen to have him design his house, in spite of all the obstacles? The path towards that answer must be navigated through two separate but overlapping routes: an examination of the way in which Grounds regarded science, and the way in which Frankel thought about architecture. But a simplistic reversal of their professional stereotypes—with Grounds recast as rationalist and Frankel as aesthete—will not lead to a satisfactory answer. Grounds, as demonstrated in Chapter 4, was highly sceptical of the so-called 'scientific age' and all the jargon that went with it.¹⁷ Frankel, on the other hand, came from a background where acute visual awareness and observational skills were just as important as scientific accuracy.

To get to the core of the answer it is necessary to uncover Frankel's roots as a geneticist, and to examine how his aspirations and ideologies in that field informed his perceptions of the physical environment. Previous connections have been established—somewhat precariously—between genetics and architecture. In *The Monumental Impulse: Architecture's Biological Roots*, art historian George Hersey cited a number of examples. Hersey believed that Vitruvius, by individually naming and specifying the measurements and proportions of the elements required to construct a temple in *De architectura*, allowed other architects to 'reproduce' his designs. Jean-Nicolas-Louis Durand, a nineteenth-century French architectural theorist, had similar intentions with his variations on facade design.¹⁸

In 1930, Hans Sedlmayr explored a potential link between genetics and architecture. An Austrian art historian and contemporary of Frankel, Sedlmayr was influenced by the experiments of Gregor Mendel, an Austrian Augustinian priest and scientist. Mendel had proven that characteristics of offspring followed specific laws that could be represented in mathematical form.¹⁹ While Mendel calculated that there were seven pairs of possible characteristics that might appear in the offspring, Sedlmayr concluded that the walls of Borromini's San Carlo alle Quattro Fontane were composed from a 'gene-pool' of five elements: convex segment, concave segment, triangular moulding, large column and small column. It was the appearance of these inherited traits as dominant elements—or, on the other hand, their non-appearance as recessive elements—that constructed the total body of the architectural organism, as interpreted by Hersey in Figure 6.4.²⁰

17 Roy Grounds, *Architecture and Arts* 1, no. 1 (July 1952): 13.

18 George Hersey, *The Monumental Impulse: Architecture's Biological Roots* (Cambridge, Mass.: MIT Press, 2001), 158–60.

19 Although Gregor Mendel (1822–84) published during Darwin's lifetime, his work was neglected until the early twentieth century when its reappraisal led to the foundation of the science of genetics. Waddington described how Mendel 'discovered that from crosses between certain types of parents particular categories of offspring were born in definite proportions which could be stated as simple arithmetic ratios'. Conrad Waddington, *The Nature of Life* (London: George Allen & Unwin, 1961), 12.

20 Hersey, *The Monumental Impulse: Architecture's Biological Roots*, 158–62.

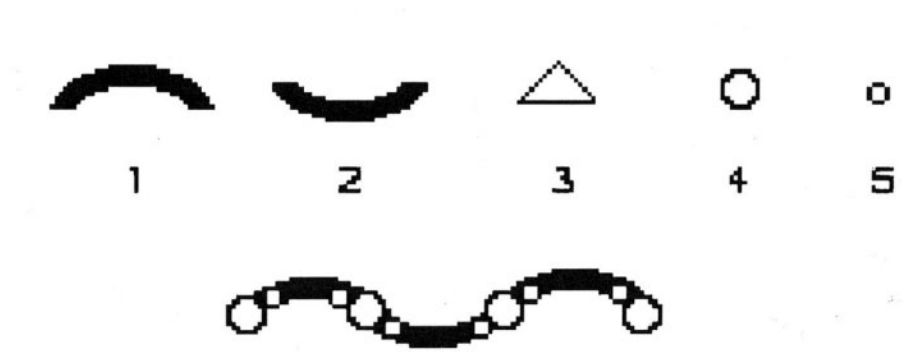


Figure 6.4 Hans Sedlmayr, the five 'genetic elements' of Borromini's architecture

Image: redrawn by George Hersey after Sedlmayr and Borromini, from Hersey, *The Monumental Impulse: Architecture's Biological Roots*, The MIT Press, 161

While the similarity between Sedlmayr's concave segment and the Frankel House plan shape was purely coincidental, the close resemblance reflects Grounds' search for a plan form that was reduced to a singular, elemental concept.

One day in 1922, Frankel attended a lecture in Berlin by Erwin Baur on plant genetics, and a whole new world opened up. Frankel was particularly challenged by Baur's Mendelian claim that he could 'work with genes and the genetic combinations' of plants in the same way that a chemist worked with 'atoms and molecules'. Frankel's enthusiasm was infectious: even though he was only in his second year of study, Baur allowed him to enrol in a PhD on the snapdragon (*Antirrhinum*), which Frankel claimed included 'the first review on linkage in plants'.²¹

In his study of the German genetics community between 1900 and 1933, Jonathan Harwood identified two distinct styles of thought: the 'pragmatists' and the 'comprehensives'. The pragmatists—exemplified by Baur—believed that genetics was a highly specialised subject requiring specific knowledge and skills for solving practical problems. Comprehensives, on the other hand, favoured a broader approach that encompassed development, evolution, heredity and morphology. Alfred Kühn, a contemporary of Baur and Professor of Zoology at Göttingen, encouraged a scholarly and holistic approach to biology based on sound observation skills. Kühn wrote: 'For the biologist who genuinely notices the diversity of organisms in nature, the question of their transformation is

²¹ Otto Frankel, Interview by Gavan McCarthy, Frankel, Sir O. H., FAA (1900–1998), 12/A; Evans, 'Otto Herzberg Frankel, 4.11.0–'; Jonathan Harwood, *Styles of Scientific Thought: The German Genetics Community 1900–1933* (Chicago: University of Chicago Press, 1993), 245; Otto Frankel, Interview by Dr Max Blythe, 15 September 1993, Frankel, Sir O. H., FAA (1900–1998), 12/A.

simply inescapable...the description and comparison of forms deserves a place alongside the experimental work.'²² Kühn possessed a highly developed visual and aesthetic sensibility, and was fascinated not only by animal morphology, but also by architecture and art—particularly the Italian Renaissance and expressionism. He believed that an appreciation of art led to a broader scientific perspective, and claimed that 'the most insightful scholars are those who have also been interested in art'.²³

In the circles in which Kühn, Baur and Frankel moved, many scientists were accomplished in fine arts, music and writing. On a lecture tour of the United States in 1938, Fritz von Wettstein visited every major art museum he could find and, like Fenner, filled his diary with details of the collections he observed. Karl Pirschle studied Egyptian art, Richard Goldschmidt and William Bateson collected fine art, Johannes Holtfreter, Carl Correns, Edmund Sinnott and Theodor Boveri were gifted artists, while Karl Henke wrote articles on contemporary art.²⁴ But, as Harwood explained, these activities were not just hobbies. It was impossible, he argued, to separate aesthetic sensibility from scientific research: for these biologists, artistic intuition was intrinsic to their work.²⁵ Underlying the connections between art, architecture and biology within that fraternity was the notion of ontological holism—a search for the nature, origins and meaning of form.²⁶

Of all the twentieth-century biologists who ventured into the realms of art and architecture, it was Conrad Waddington who became the most well known. And it was Waddington who, through a long professional and personal association with Frankel, was the one most likely to have influenced his way of thinking. Frankel first met Waddington in the late 1920s when he spent nine months at the Plant Breeding Institute in Cambridge, where Waddington was a lecturer in zoology and Fellow of Christ's College. From there, their paths continued to cross. One connection was through their wives. Waddington's second wife, the architect Justin Blanco White, was the daughter of the feminist writer Amber Reeves, and grand-daughter of the New Zealand politician and social reformer William Pember Reeves, who had represented Christchurch in Parliament. The Reeves family had built Risingholme, which they later sold to the Andersons,

22 Alfred Kühn (1950, 178), cited by Harwood, *Styles of Scientific Thought: The German Genetics Community 1900–1933*, 235. Alfred Kühn was no relation to Thomas Kuhn.

23 Ibid., 240–1.

24 Other biologists who were known for their visual sensibility included Otto Bütschli, Ernst Haeckel and Carl Chun. Fritz Baltzer, Viktor Hamburger, Hilde Mangold and Fritz Süffert were of a similar inclination. Ibid., 255, 257, 358.

25 Ibid., 255.

26 'The aesthetic appeal of biological form, combined with the intellectual puzzle as to how it is generated in development and modified in the evolutionary process, made biology especially attractive to this generation.' Ibid., 257. 'This ability can be understood as a part of the sense of form which makes a good naturalist and morphologist.' Richard Goldschmidt, *Portraits from Memory: Recollections of a Zoologist* (Seattle: University of Washington Press, 1956), 62–3.

Margaret Frankel's family. (It was on part of the Risingholme estate that the first Frankel House, designed by Plischke, was built.) In later years, Waddington and Frankel sat on the committee of the International Biological Program.

Waddington was so well connected in cultural and artistic circles that a colleague once described him as more of an artist than a scientist.²⁷ His friends included Walter Gropius, the artists John Piper, Henry Moore, Barbara Hepworth, Ben Nicholson, Alexander Calder and László Moholy-Nagy, the physicist and novelist Charles Snow, and the scientists Sir Julian Huxley and John Bernal.²⁸ He published prolifically, and spent a large part of his career exploring the overlapping territories between biology and the visual aspects of art and architecture. In 1941 Waddington published *The Scientific Attitude*, in which architects and architecture were given special prominence. Along with the best architectural polemicists of the period—such as Le Corbusier—Waddington complemented his text with evocative, black-and-white photographs of images of the modern world.²⁹

Waddington gave many public lectures, including one titled 'Biological Form and Pattern' at the Architectural Association at Bedford Square, London, in May 1958. A study of biological form in relation to geometry, this talk covered ontological aspects such as symmetry, repetition, rhythm and periodicity, and ended with a similar analysis of painting and sculpture.³⁰ A series of lectures at the University of Wales led to Waddington's most comprehensive and best-known exploration of the nexus between science and art: *Behind Appearance*, published in 1969.³¹

Waddington and Frankel had much in common. Both were geneticists, and although Frankel had trained in the pragmatic school, the wider knowledge that he received through subsequent experience indicated a strong comprehensive tendency. Both had married women of New Zealand extraction who worked in the closely related professions of architecture and art. Both located themselves at the centre of artistic and cultural communities, and in doing so became

27 John Bernal, 'Vote of Thanks' [to Waddington after his talk at the Architectural Association], *Architectural Association Journal* LXXIV, no. 825: 77.

28 Conrad Waddington, *The Scientific Attitude* (Pelican Books, 1941), 10; Conrad Waddington, *Behind Appearance: A Study of the Relations Between Painting and the Natural Sciences in this Century* (Edinburgh: Edinburgh University Press, 1969), Foreword.

29 Waddington claimed: 'Of all the artists, it is probably the architects who have realised most fully both the scientific character of the point of view to which they have come, and the existence of an essentially poetic element in scientific thought.' The reason for this was simple: architecture was 'half scientific', and in order to fully understand the potential of new materials such as reinforced concrete and glass, the architect needed to become like an 'applied scientist'. Waddington, *The Scientific Attitude*, 49.

30 Conrad Waddington, 'Biological Form and Pattern', *Architectural Association Journal* LXXIV, no. 825: 71–6.

31 Waddington, *Behind Appearance: A Study of the Relations Between Painting and the Natural Sciences in this Century*.

exposed to contemporary attitudes in art, design, architecture and literature. But Frankel differed from Waddington in one key respect: in spite of his lifelong patronage of modern art and architecture, he was always perceived as a scientist—nobody accused Frankel of being ‘too much of an artist’. Unlike Waddington, whose publication record reflected his position as a leader of the comprehensive school, Frankel generally limited his research and publication activities to scientific fields.

But there was one notable exception. In 1981, following Grounds’ death, Frankel published a tribute to his friend in the *Historical Records of Australian Science*. In this acknowledgment of Grounds’ contribution to Australian domestic architecture, Frankel explained how the architect had been a true comprehensive. Grounds, he said, had aimed to

integrate the nature of the site, its possibilities and challenges, the chosen materials, the surroundings, and, foremost, the requirements, ideas, idiosyncrasies of the client, to result in a building in which simplicity and efficiency in construction and operation were combined with evident effort (and with evident success) to perpetuate the kind of good taste which some modern architects neglected.³²

Frankel noted that while Grounds responded to a range of criteria before he settled upon a design solution, he always limited himself to a set range of materials, components and spatial permutations: ‘Interior brick walls and floors, hardwood wall covering fixed vertically, muted colours, a minimum of paint. Space was broken up to the least possible extent, allowing the most adaptable use and providing pleasing aspects throughout the building.’ Adding that ‘the planning of form and space’ became a dominant theme, Frankel elaborated on three Grounds houses. The architect’s own house in Hill Street, Toorak, of 1954, was ‘a square unit with a round, glassed-in courtyard-garden in the centre, and wide-open living space in between’; the 1951 Leyser House in Kew was triangular; while the 1952 Henty House in Frankston (the second house for that client) was circular and ‘attracted wide publicity’.³³

Frankel was aware that his creative architect was influenced by a wide range of sources, and that his designs were not generated purely through an analysis of site conditions or client requirements. For instance, even though Grounds had stated that the circular plan of the Academy of Science building was ‘strongly influenced by the shape of the site’ and that ‘the domed shape was a corollary of the rounded hills and mountains which enclose the valley of Canberra’, Frankel doubted that these were the main reasons for the architectural form. He knew that Grounds had visited Saarinen’s Kresge Auditorium in Cambridge,

32 *Historical Records of Australian Science* 5, no. 3 (1982): 89–91.

33 *Ibid.*

Massachusetts, which was completed in 1955. Constructed of a concrete shell, sheathed in copper, which formed a one-eighth segment of a sphere, the structure was enclosed by glass curtain walls and attached to a circular brick platform at only three points. Grounds had been particularly impressed by Saarinen's auditorium, and the similarities between it and the Academy of Science building led Frankel to conclude that the architect's references to the rounded hills of Canberra 'may have been an afterthought'. Conrad Hamann shared this view.³⁴

Frankel was unaware what form his Cobby Street house would assume. He did not know whether it would respond to some aspect of the surroundings or simply follow Grounds' intuition. But he was familiar with the gene pool of characteristics—including materials, colour and articulation of internal space—that his architect operated with. When Frankel wrote to Grounds asking him to design their house, he claimed that he and Margaret were 'thoroughly happy' with the 'architectural language' that Grounds had developed, and how this language had 'led to the elements we have come to like and admire'.³⁵

While an attempt has been made to locate Frankel's attitude to architecture, what of Grounds' perception of science? It has been established that he was sceptical of the so-called 'age of science'. But how did the way in which Grounds viewed science impact upon his relationship with Frankel, and how did it affect the design of the Frankel House? There was one particular aspect of science that motivated Grounds, and it had nothing to do with the popular practices of borrowing scientific methodology or metaphors. What interested Grounds were the scientists themselves—in particular, the way in which they thought. Remembering the Academy of Science building, Grounds recalled:

What I was concerned about was in the main that the scientists were a group to me of very mysterious men. Sir Mark Oliphant was chairman of the building committee, a loveable man, a very dominating character, a very wilful man and a very loveable human being, and I became very attached to him and his colleagues.³⁶

34 Ibid., 89–91. Hamann believed the fact that Grounds had 'tried and failed to get a hemispherical house built five years earlier' was a more plausible reason for the form of the Academy of Science building than was its supposed relationship to the 'rolling hills of the Canberra countryside'. Hamann, *Modern Architecture in Melbourne: The Architecture of Grounds, Romberg and Boyd, 1927–1971*, 295. For an analysis of the influence of geometry on Victorian architects during this period, see Philip Goad, 'Form and the So-Called Melbourne Geometric School', in *The Modern House in Melbourne 1945–1975* (PhD dissertation, University of Melbourne, 1992), 5/39–5/62. In a later essay on domes, Goad stated that the most commonly cited source for Grounds' Academy of Science dome was an amalgam of Saarinen's Kresge Auditorium with the same architect's adjacent Kresge Chapel. Philip Goad, 'Shells, Spires and a Dome: Science and Spirit in the Space Age', in Ann Stephen, Philip Goad and Andrew McNamara, eds, *Modern Times: The Untold Story of Modernism in Australia* (Melbourne: Miegunyah Press, 2008), 141.

35 Frankel to Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

36 Roy Grounds, De Berg Tapes, National Library of Australia, Recorded in Melbourne, 11 October 1971.

Grounds came to two important conclusions. The first was that scientists understood art better than artists understood science. The second was that scientists were ‘intensely creative’ people. To Grounds, there was something rational and disciplined—but at the same time opaque and enigmatic—about the Academy of Science clients. It was with this dialectic in mind that he proceeded to design their building:

I wanted a sense of enormously disciplined order, which is the way their minds work, and I wanted it to have a big emotional impact, because they are very emotional people. They’re intensely creative but they don’t know how to create in an abstract way. That was my task. And so it was a blending of forces: they were emotional, they were intellectual, they were intensely personal, and I decided that I must produce a building that combined all of those factors.

An impossible brief, it would seem, given the complexity and contradictions within the above statement. But then Grounds proceeded to conceal his design process under a shroud of mystery, describing it as a creative act that defied rational explanation: ‘There was no preconception, there was no anything, and so it grew out of me, out of them.’ In case there was any doubt remaining about the elusive and indeterminable origins of the Academy of Science building, he finished with ‘[t]here is no other reason why that building...it can’t be rationalised’.³⁷ But perhaps, to some extent, it could. While Grounds was correct that there was no rational connection between the form of the Academy of Science building and the clients’ needs—it did not represent discipline, emotion, intellect or the personal—there was a simpler explanation for its origin: Frankel, for one, clearly believed that the structure owed much to Saarinen’s Kresge Auditorium.

The Mathematics of [Re]Production

But I must not teach my grandmother what to do with the eggs!

— Otto Frankel, letter to Roy Grounds³⁸

There is some irony in the fact that the last house designed and built by the environmental conservationists Grounds and Frankel—and indeed the final house of this book—should have owed so much to a road. In fact, the Frankel

³⁷ Ibid.

³⁸ This was a very detailed letter in which Frankel explained how he, Margaret and John Philip had redesigned a significant portion of the house. The ‘eggs’ reference was associated with their questioning of the size of the shower cubicle in the main bathroom. Frankel to Grounds, 6 November 1969, Frankel, Sir O. H., FAA (1900–1998).

House was indebted not just to one road, but to three. Directly attributable were both origin and form: the house would not have been required if it were not for the arrival of Barry Drive; it was the shape of Cobby Street that generated its architecture, while it was the threat of yet another proposed road—Monash Drive—that influenced the landscape design.³⁹

The way in which the house, and the constructed elements of its landscape, reproduced the form of Cobby Street and sought to provide shelter from a potential environmental threat, can be compared with the biological term mimicry, where plants and animals assume physical resemblances to their surroundings as a means of self-protection. This was further enhanced by the Frankels' choice of materials and colours: 'darkish brownish in harmony in bush.'⁴⁰

The mimetic form was nothing new for Grounds. As Hamann explained, the architect had experimented with relating building form to some aspect of site shape from an early stage in his career. The walls of his 1940 Quamby Flats in Toorak were set out radially from the centre-point of Glover Court, so that each flat became a segment of a circle. A project for Sir Lawrence Hartnett responded to a conical site in a similar way. In a number of houses designed for unorthodox-shaped sites—including the 1948 Hall House and the 1949 Neale House—Grounds allowed the boundaries of the site to dictate the outline of the house.⁴¹ Of all the Grounds houses, however, the one that was closest in form to the Frankel House was an unbuilt proposal for Australian Prime Minister Harold Holt, designed in 1960. Although it was a much larger house, built over two levels, the Holt House was based on the same arc shape with cross walls set out in a radial pattern.⁴²

After Grounds agreed to take on the Frankel House, Otto sent him a very detailed brief. Four pages of typewritten notes, divided into separate subheadings for each space, specified room relationships, fenestration, furniture and storage. Six metres of bookshelves were required, while Margaret's pottery kiln could be relocated to Campbell only once their current house in Nicholson Crescent had been demolished around it. It appears that, even at that early stage, Frankel had

39 Monash Drive was a road proposed on the Territory Plan to link Canberra's easternmost suburbs in a north-south direction, and would have cut across the lower slopes of Mount Ainslie. It was not built and was finally removed from the Territory Plan in 2009.

40 Theo Bischoff, Handwritten notes at meeting with Grounds and the Frankels, 3 February 1969, 'Point 5, "Exterior"', Bischoff, Theo, Box 5, 'Frankel House, Campbell', File 2/2.

41 Hamann, *Modern Architecture in Melbourne: The Architecture of Grounds, Romberg and Boyd, 1927–1971*, 61, 286.

42 *Ibid.*, vol. 2, Bibliography and Catalogue, Figure 7, 15.

some inkling of what the final form of the house might be. Amongst his written specifications was the following comment: 'If the house is L (or U) shaped, one should think of a future wall as protection should Monash drive eventuate.'⁴³

The Frankel House site, which Grounds studied in late 1969 when he began to prepare the sketch plans, was irregularly shaped. Located at the end of Cobby Street where it branched off Rosenthal Street and curved sharply, the site was fan-shaped—like a segment of a circle with the apex removed. The shortest boundary, facing onto Cobby Street, was curved to follow the line of Cobby Street, whose centre-point it shared. The two side boundaries radiated out from the same centre-point, while the boundary to the rear of the block was formed by another curve—one that was generated from a different centre-point. The Cobby Street frontage of the block faced south-west.

In October 1969, Grounds prepared a plan of the house. He proposed a single-level, rectangular-shaped house, curved along its major axis to form a shallow arc shape, with the concave side facing the street. The curvature of the arc was generated from the same centre-point as Cobby Street, with the radius of the internal (street-facing) wall being 6.4 m.⁴⁴ While the longitudinal external walls were both curved, both end walls, and all internal cross walls, were radial. Internal longitudinal walls were generally faceted (broken down into shorter, straight sections).

The internal layout was tripartite, divided into separate zones by radial cross walls. The north-western zone contained 'service' functions—garage, utility (pottery workshop) and tool shed; the middle zone contained the living, dining and kitchen areas; while the south-eastern area contained three bedrooms, two bathrooms and a study. The south-eastern zone was designed to accommodate a live-in nurse to care for the Frankels in their later years. The nurse was to use the guest bedroom for sleeping and the study—which had its own external access via a raised porch and steps—as a sitting room. This idea of the live-in nurse—which never eventuated—also explains the reason for the two adjacent bathrooms described as 'main' and 'guest'.⁴⁵

With the combined lengths of the service zone and the living zone approximately equalling that of the bedroom wing, and the recessed entrance porch placed between, the Frankel House was symmetrical when viewed from Cobby Street. The central location of the front door recalled Grounds' own house in Toorak.

43 'Original brief supplied to RG', Undated document consisting of four typed pages with handwritten notes added, Bischoff, Theo, Box 5, 'Frankel House, Campbell', File 2/2.

44 In 1969, the imperial system of measurement was still in place. Australia changed over to the metric system between 1970 and 1988. For consistency, all original measurements specified by the architects have been left in the imperial system.

45 Stephen Frith, In discussion with the author, 4 Cobby Street, Campbell, 18 August 2009.

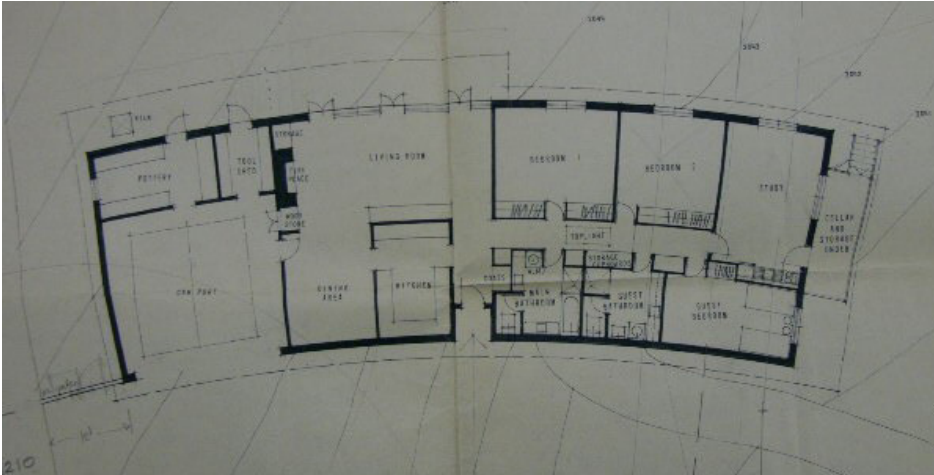


Figure 6.5 Frankel House, preliminary floor plan, October 1969. Service functions to the left, living zone in the centre, bedrooms on the right. Cobby Street is to the bottom of the sheet

Image: ACT Heritage Library, Bischoff, Theo – Architectural Records, 0159. Courtesy of Victoria Grounds and Phoebe Bischoff

The plan of the Frankel House indicated that geometric form was Grounds' primary consideration. By reproducing the curve of Cobby Street in the footprint of the house, he relegated issues such as natural site contours and solar orientation to secondary priority. The site is located on the lower slopes of Mount Ainslie, and falls from north to south. But Grounds' arc cuts across the natural site contours rather than following them. Based on a finished floor level of 100.00, the highest natural point of the site (RL 103.00) is at the northernmost corner of the utility room, while the lowest is the guest bedroom in the opposite corner, at RL 95.5. With no changes of level throughout the house to accommodate the fall, the difference between the highest and lowest levels—2.3 m—meant that a significant amount of cut and fill was required in order to achieve a single-level house.⁴⁶

The problems regarding the shape and orientation of the Frankel House were further compounded in terms of solar orientation. In this regard, the house was reasonably positioned, but far from ideal. With its major facades facing north-east and south-west, and with the service zone in the north-western corner, the pottery workshop—which Grounds initially showed with no windows to the north—and tool shed occupied the sunniest parts of the house. If the house had

⁴⁶ Theo Bischoff, Drawing B107-4p, 'Preliminary slab layout, showing building work below top of floor, draft only, 24.2.70', Bischoff, Theo, E 1 FF 14-25.

followed an east–west principal axis, with the rooms facing north, it would have been a much more successful solution for solar orientation, and for minimisation of cut and fill.

All of this indicates the lengths to which Grounds was prepared to go in order to mimic the road—whose form was, after all, an arbitrary one created by NCDC road engineers. The simple gesticulatory flourish with which Grounds bent his wrist and allowed his pencil to follow the curve of the street was a familiar creative process, and one he had successfully employed on previous projects. Perhaps expediency was part of the reason: having completed the National Gallery project, Grounds was turning his attention to the Cultural Centre and Concert Hall, and would have had little time for other projects.

Frankel had no problem with Grounds' methodology. He was aware that geometrically derived solutions were a *modus operandi* of his architect. But the internal layout of the house was an entirely different matter, and one in which both Otto and Margaret became heavily involved. Having praised Grounds before he accepted the commission—'you know us so well that we would scarcely have to use more than shorthand in conveying our own ideas'⁴⁷—his clients had no hesitation in criticising the layout once they received it. The dining room was 'in a dark corner' and had an undesirable entrance directly off the garage, which would 'be behind somebody's chair'. Margaret preferred a sideboard in the dining area with direct access to the kitchen, where they could 'serve and carve'. The living area, they believed, was 'rather diffuse'. With the dining room so close, it would not be quiet enough for people sitting around the fireplace, while the depth of the living room—between the fireplace and bedroom one—was too large and 'scarcely usable', particularly now they no longer held 'stand-up' parties.⁴⁸

The Frankels then proceeded to redesign the living areas of the house—a task for which they enlisted the advice of John and Frances Philip. The kitchen was turned through 90 degrees, so that instead of protruding into the living space it was set back parallel to the Cobby Street facade and opened up extra space towards the centre of the house. This allowed the fireplace unit to be detached from the radial wall and left as a freestanding unit to separate the dining and living spaces—where it was more effective both thermally and spatially. This resulted in the dining room becoming located on an external wall, facing north-east, where it was more clearly defined as a separate space to the living area. The living space was more practical in size, and the door from the garage opened onto a circulation space rather than into the centre of a room. There was a stronger connection between the kitchen and the dining space, whereby the connecting

47 Frankel to Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

48 Frankel to Grounds, 6 November 1969, Frankel, Sir O. H., FAA (1900–1998), 13/C.

doorway was at the end of the dining area rather than in the middle—where, like the door from the garage, it would have clashed with a dining chair. A generous servery was accessible from a major circulation route, rather than from the dining room itself. All of these improvements, plus possible solutions to address the lack of a dedicated laundry space, were set out in a letter from Frankel to Grounds.⁴⁹ Attached were revised plans and detailed instructions about the preferred location for a variety of items: firewood, art books, pottery, after-dinner drinks and coffee cups.⁵⁰

In December 1969, Grounds incorporated the suggestions into a revised plan that represented a significant improvement on his rather crude and unresolved preliminary sketch. The new plan reflected a better understanding of the ways in which the spaces were to be used, and was more successful in terms of functional relationships, articulation of space and circulation flow. If it were not for the intervention of Grounds' clients—both current and former—the Frankel House would have been both impractical and uncomfortable, and could well have been a disaster.

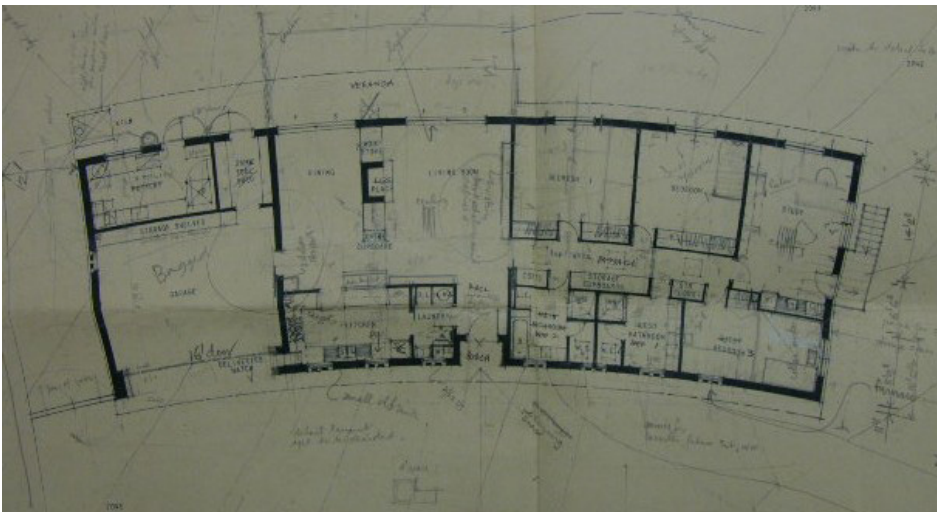


Figure 6.6 Frankel House, revised plan, December 1969

Image: ACT Heritage Library, Bischoff, Theo – Architectural Records, 0159. Courtesy of Victoria Grounds and Phoebe Bischoff

This entire intervention occurred before Bischoff appeared on the scene.⁵¹ At 10.40 on the morning of 3 December 1969, Grounds arrived at the Canberra

49 Otto quoted Margaret as stating that Grounds' proposal for clothes to be washed in the main bathroom was 'rather slummy'. Ibid.

50 Ibid.

51 Grounds sent Bischoff a print of the preliminary schematic plan in November 1969, noting that, while it indicated 'the general location and shape of the proposed house sketch plans were currently undergoing

Aerodrome on TAA Flight 406. Bischoff greeted him there and they drove to meet the Frankels, to whom Grounds presented the revised sketch plans. It was a relatively short meeting—Margaret Frankel was a jury member for the C. S. Daley Architecture Award, which was being judged that afternoon⁵²—but there was ample time for Bischoff to jot down a few salient points. The house was to be of brick veneer to allow for a ‘timber interior’, with ‘ply face in corridor’. The exterior was to be ‘darkish brownish in harmony [with] bush’, the budget was \$50 000 overall, and the program was tight: tenders were to be called within three months and the construction period was to be six months.⁵³ After returning to his office and writing ‘superseded’ across the original plan, Bischoff studied Grounds’ new drawings—three sheets containing revised plan, elevations, roof details and brick grille details—and began to consider how the Frankel House would be documented and built.

Bischoff held a number of subsequent meetings with the Frankels and discussed further details of the layout, materials and colours. The Frankels confirmed that internal walls were to be of plywood, the floor was to be carpet, and the ceilings of ash boards spaced apart, running in a radial direction. Otto told Bischoff that the boarded ceilings should be continued through to the kitchen.⁵⁴ Details of the pottery room were finalised, the garden layout was discussed, and external materials were selected. In keeping with the desire for the house to reproduce the darker colours of the bush,⁵⁵ the Frankels chose ‘Tan Manganese Nutex’ bricks to be ‘raked with dark mortar’, a fascia of ‘Burnt Copper’ and bronze anodised aluminium windows.⁵⁶

In late February 1970, Bischoff sent prints of the working drawings—comprising 10 A2-sized drawings—to Grounds in Melbourne for his approval. In the accompanying letter, he stated that the project had ‘proven quite a difficult undertaking’.⁵⁷ The reason for this was the curved form of the house: what appeared to be a simple gesture in plan form had implications for almost every component. To begin with, the mathematical setting out of the arc was

development’. Grounds to Bischoff, 20 November 1969; Bischoff reply, 26 November 1969; Bischoff, Handwritten notes, 3 February 1969, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

52 Bischoff to Grounds, 26 November 1969, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

53 Theo Bischoff, Handwritten notes, 3 February 1969, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

54 Bischoff, Handwritten notes at meeting with Grounds and the Frankels, 3 February 1969, ‘Point 1, “Site & character”’; Handwritten notes at meeting with the Frankels, 1 May 1970, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

55 Bischoff, Handwritten notes at meeting with Grounds and the Frankels, 3 February 1969, ‘Point 5, “Exterior darkish brownish in harmony in bush”’, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

56 Ibid. Bischoff met with the Frankels on 9 December 1969, 3 February 1970 and 20 February 1970, when they chose a dark-coloured brick from the trade catalogue of Multibricks, a Queanbeyan supplier. ‘Nutex Face’ referred to the surface texture of the brick, which was lightly pitted in a random pattern (also available was ‘Rustic Face’, a rough, patterned surface, and ‘Vertex Face’, whose parallel vertical marks expressed the wire-cut process).

57 Bischoff to Grounds, 25 February 1970, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

complex, particularly given that it was carried out without the aid of computer technology. The thorough and methodical Bischoff—who, as a former employee of structural engineer and mathematician Mussen, was experienced in this area—filled at least 14 foolscap-sized pages with handwritten trigonometric calculations. He manipulated sines, chords and arcs until he found the right combination and shape.⁵⁸

Just how thorough Bischoff was can be seen in his dimensioning of the Cobby Street wall. In addition to the radius, which was taken from the Grounds plan, Bischoff also dimensioned the wall as an arc (the ‘true’ length of the wall taken around the line of the curve) and as a chord (a straight line drawn between the two end points). The plans contained ‘notes on setting out’, in which Bischoff confirmed that all cross walls were to be radial, while walls along the length of the building were concentric with the street boundary. Also concentric was a 17 m long garden wall that was set back 12 m from the rear of the house to provide privacy from Monash Drive. To make sure that his instructions were fully understood, Bischoff requested the builder mark out the position of the walls on the top of the concrete slab before proceeding.⁵⁹

No element of the Frankel House escaped the tyranny of the centre-point. A landscaping plan prepared by Bischoff showed how not only were the house and garden walls set out in ever-expanding arcs from the same centre-point; beyond them, a row of fruit trees, a concrete path and a vegetable garden were all concentric.⁶⁰

The geometric setting out of the materials and components was the most difficult part of the documentation. Bischoff pondered over whether linear materials should be set out in a radial or tangential direction, and whether curved elements were to be literally curved or made up of short, straight segments. He resolved that the external brick wall veneer was to be circular in form, as were the fascia and eaves. Internal curved walls were to be made up of straight chords joining concentric points, and clad with plywood on timber framing. Ceilings were to be ash boards, spaced apart over foil paper, running in a radial direction. The front faces of kitchen benches and cupboards were to be constructed in straight segments. Although the fascias were to be curved and skylights set out radially, the Brownbuilt steel ribbed roofing, and majority of the framework, was to be on the orthogonal.

For some of these issues, Bischoff sought Grounds’ opinion. One question was the direction of the ash boards to the eaves soffits. After initially believing that they

58 Ibid.

59 ‘Working drawings, Frankel House’, Bischoff, Theo, E 1 FF 14-25.

60 This was a rough sketch, which is why it is not reproduced here. ‘Landscaping Plan, Frankel House’, Bischoff, Theo, B107-1 b, E 4 CC 10. Ray Margules was a landscaping consultant.

should be set out radially—like the internal ceilings—Bischoff changed them to be concentric generally, but radial on the wide eaves to the rear terrace and street entrance.⁶¹ Grounds agreed, except for the main entry, where he believed they should run concentrically like the rest of the eaves on that elevation. He also added that the house was going to be ‘really first class’. In a later note to file, Bischoff proudly recorded his mentor as saying the documents, which he had laboured over so carefully, were ‘a sheer delight’.⁶²

But the difficulties associated with building an arc-shaped house did not end with the documentation. Bischoff had a fight on his hands to make sure that the subtlety of the curved line was not compromised through poor workmanship. Bricklayers normally set their bricks out with the aid of a string line. Nothing more than a piece of string secured at both ends and pulled tight, it is a traditional and very simple solution to the problem of how to define the outer face of a brick wall during construction. But it is not possible to set out a curved wall with a string line, and the smooth profile of the finished wall is testament to the skill and patience of Roetzer’s bricklaying team.

Bischoff’s other concern was reproducing the curve of the arc on the fascia, which formed the edge of the roof. Constructed of Brownbult 12-inch Mark III profile galvanised-steel roofing trays laid horizontally with the ribs facing inwards, it was a similar detail to commercial and industrial buildings. Bischoff was not satisfied with the way the fascias had been fitted, and met Roetzer and the roofing contractor on site, on 27 April 1971, to relay his concerns. The list of defects he identified included ‘joints, dips at corners, making good, touch up...pop rivet front capping, birdproofing end cappings, slope rear cappings, fixing down of lap fronts’.⁶³ By late May, with the situation still not rectified, he issued a handwritten reminder: ‘NOTE. AS FIRST ADVISED, BUILDING APPEARANCE DEPENDS ON A WELL EXECUTED FASCIA.’⁶⁴

Two days later, Bischoff fired off a letter to the roofing contractor: ‘As has been stated to you a number of times, the fascia has been and remains critical to the appearance of the house and to the building progress.’ But sadly, in spite of his best efforts to fix the problem, Bischoff was denied a satisfactory outcome; a later file note read: ‘Fascia: not satisfactorily completed but accepted deduction to be made.’⁶⁵

61 Bischoff to Grounds, 25 February 1970; 26 February 1970, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

62 Roy Grounds, Letter to Theo Bischoff, 11 March 1970; Theo Bischoff, Note to file, 24 April 1970, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

63 Bischoff, Note to file, 27 April 1970, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

64 Bischoff, Note to file, 29 May 1971, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, File 2/2.

65 Bischoff to roofing contractor, 31 May 1971, Undated file note, Bischoff, Theo, Box 5, ‘Frankel House, Campbell’, Files 1/2 and 2/2.

An Artistic Gesture

We prefer our own company to that of others.

— Otto Frankel⁶⁶

The above comment was Frankel's favourite response to a question he was often asked: why did his house have no windows facing the street? But he was joking; Otto and Margaret were hospitable entertainers who welcomed many people into their house. The question remains, however: why did the house appear so private, so withdrawn and detached from the street? And why did the Frankel House provoke so many comments, such as that made by Peter Frith, son of the current owner, who rather unflatteringly compared the family house with a public toilet block?⁶⁷

The provision of private space was a common thread that linked all three Frankel houses. The form of the Plischke-designed Christchurch house—an 'L'-shape built around a private, walled garden—was generated by the desire to provide maximum privacy from both road and neighbours. Plischke envisaged this house—his first in New Zealand—to be a prototype for a new model of urban living. In *Design and Living*, he described the Frankel House: 'Far from being a show-piece on the street front the garden is domestic and private. It becomes even more private if the neighbouring houses have similar shaped plans, enabling the bedroom wings of the houses to create enclosed living courtyards.' But this house type was possibly too private, and too urbane, for its time and context in 1930s New Zealand.⁶⁸

When Frankel wanted his second house, in Canberra, to be built on a corner of the CSIRO's land, close to his laboratories, Ian Clunies-Ross questioned whether that was an appropriate environment for the head of the Division of Plant Industry. Frankel's abrupt response was: 'We don't mind. We make our own environment.'⁶⁹ Some years later, when Otto and Margaret were offered the

66 Frankel, quoted by Lloyd Evans, In discussion with the author, May 2009.

67 Stephen Frith, In discussion with the author, 18 August 2009. Frith said that Peter came to this conclusion after noticing similarities between the house and a toilet block in the Canberra showgrounds at EPIC.

68 Ernst Plischke, *Design and Living* (Wellington: Department of Internal Affairs, 1947). Douglas Lloyd Jenkins wrote that the Frankel House in Opawa remained an 'essentially isolated' example of modernism in New Zealand, and that it 'alluded to a more expansive, more urbane world than was typical of domestic life in the 1930s (it simply doesn't look like New Zealand in the 1930s), this promise did not survive translation into the built structure'. Douglas Lloyd Jenkins, *At Home: A Century of New Zealand Design* (Auckland: Godwit, 2004), 82, 109.

69 Lloyd Evans, 'The Man: Sir Otto Herzberg Frankel, 4 November 1900–21 November 1998', [Obituary for the Royal Society, London, 1999], Frankel, Sir O. H., FAA (1900–1998), 12/C.

new site in Campbell, Otto wrote to Grounds describing how the few existing houses in the precinct 'could be readily screened by fast growing eucalypts and wattles'.⁷⁰

In Frankel's ideal environment, the protection of views looking outwards was just as important as the prevention of other people looking in. Lloyd Evans recalled an issue that arose one day in Frankel's Black Mountain office:

He was working up a head of steam once, looked out the window, saw the washing (to the rear of Bruce Hall, an Australian National University student residence across the road) and immediately wrote a letter... complaining that CSIRO did not relish being in the backyard of an 'Italianate slum'.

As a result of Frankel's complaint, the university constructed a brick screen wall that later became known as 'the Frankel fence'.⁷¹ Another indication of the Frankels' need for privacy was evident during the construction phase of the Cobby Street house, when they requested that their names be omitted from the signboard.⁷²

While the plan form and orientation of the Frankel House were not ideal for site topography or solar orientation, those same aspects were highly functional when it came to the question of privacy. Essentially an impervious wall, two rooms deep, the Frankel House formed a barrier between the street and the rear garden. The concept of the house as a protective shield between public and private was dramatised through a lack of visible fenestration on the public side—the principal reason the house elicited so many comments about its appearance. Grounds' only concession to the concept of 'windows' on the Cobby Street elevation were seven repetitive grilles, formed by leaving geometric openings in the stretcher bond brickwork. While windows were placed in the cavities behind these grilles—some as operable louvres, others as fixed glass with a mechanical fan—they were not visible from the outside of the house.

In spite of the private aspect to the rear, fenestration to that elevation was limited to two sliding doors (one each to the dining and living areas), and relatively modest bedroom windows. A potential lack of natural light to the interior was offset with a series of small roof-lights: three to the passage, two to the kitchen and one to each bathroom. This aspect of the Frankel House marked a departure

70 Frankel to Grounds, 31 July 1968, Frankel, Sir O. H., FAA (1900–1998), 13/C.

71 Lloyd Evans, Handwritten notes, 'Otto Dinner 4.3.80', Frankel, Sir O. H., FAA (1900–1998), Box 15, Item D, 17.

72 Frankel to Grounds, 6 November 1969, Frankel, Sir O. H., FAA (1900–1998), 13/C; Bischoff, Note to file, 24 April 1970, Bischoff, Theo, Box 5, 'Frankel House, Campbell', File 2/2; Drawing no. B107-14, Bischoff, Theo, E 1 FF 14-25. In accordance with their instructions, Bischoff sketched a signboard specifying himself as 'Executive Architect', Grounds as 'Consulting Architect' and Roetzer as builder.

from most other Grounds houses, where a clear distinction between public and private aspects was articulated through fenestration. The architect's own Hill Street house, for instance, also presented a solid, impervious shell to the street, but opened up in the centre to a fully glazed, private courtyard. One possible reason for the lack of windows on the private side of the Frankel House was the uncertainty surrounding Monash Drive.

The external materials were typical for a Grounds building: industrial-style bricks, anodised aluminium windows, metal roof and metal fascia. Yet in terms of materials and finishes, the house incorporated a further departure from his previous houses: a clear disjunction between outside and inside. In the Vasey Crescent houses, for instance, the interior was a continuation of the exterior: walls of concrete block extended inwards, and timber boarding on eaves soffits continued inside to become ceilings. Grounds' own house in Hill Street followed a similar principle; although it contained timber ceilings and timber joinery, the remaining internal surfaces were lightly bagged and painted brickwork walls that reflected their external counterparts. The Frankel House, with its complete internal sheathing of timber, broke the tradition of a seamless continuity between exterior and interior.

From the understated and anonymous Cobby Street facade, nothing of the interior was revealed. The true function of the building, the disposition of its internal spaces and the activities that took place therein were all hidden. In this respect the Frankel House was one of the most private of the Grounds houses, even more so than his Hill Street house, which, although it presented a private face to the street, provided glimpses of the interior through a continuous strip of windows at a high level.

Once inside the Frankel House, the transformation between private and public was complete: the house revealed itself as a beautifully crafted vessel that cosseted its occupants in a lush, private, internal world. The spaces, materials and detailing all contributed to the impression of a cocoon-like interior that enveloped its occupants in a warm and private inner sanctum. The brick grilles—which, from the outside, gave away no clues about the interior—suddenly assumed a whole new significance. From the safety and anonymity provided by the house, the inhabitant was able to observe the outside world without being detected.⁷³

73 This aspect of the house was emphasised by Stephen Frith, the current owner.



Figure 6.7 Frankel House, view from dining room

Photograph: Ben Wrigley, 2011

This feeling of being wrapped in a protective cushion and insulated from the outside world was accentuated by a low ceiling height of 2.5 m throughout the house, and further enhanced by the warm glow of the timber surfaces: ‘Hanbro’ rotary-cut, Victorian ash-faced plywood veneer to the walls and doors, and 75 x 25 mm ash boards to the ceilings. All of these timber surfaces were finished in clear, matt polyurethane.

In the comprehensive documentation, Bischoff included a number of measures to maintain clean, uninterrupted surfaces and spaces. To ensure that nothing could detract the eye from the sensuous, curved lines of the internal spaces, he instructed the builders that ‘there are generally no skirtings or cornices, and, except in Bathroom area, no architraves’. Bischoff maintained visual continuity by coordinating the height of doorknobs and light switches to a uniform 1 m above the finished floor level. A variety of storage spaces—for specific items such as toilet paper—was ingeniously recessed into the brick cavities and covered with sliding or hinged flush ply panels that matched the surrounding wall surfaces.⁷⁴

There were other measures to create privacy. A short, radial section of trellis constructed of 25 mm square timber verticals fixed to both sides of horizontal

74 Bischoff, Working drawings, Frankel House, April 1970, Bischoff, Theo, E 1 FF 14-25.

timber rails was provided outside the dining area. This was to divide the rear terrace into two separate zones, for dining and for pottery, and to screen views from the dining terrace into Margaret's work area. Bischoff maintained acoustic privacy by specifying sound-insulated walls between the living space, bedrooms and study.

The interaction between Grounds and the Frankels on this, the final house in the book, reveals more about relationships between architecture and science. It also helps to unravel the separate threads of artistic expression and scientific rationality that weave through this investigation of Canberra houses. When Frankel asked Grounds to design this house, it is clear he had complete faith in his architect. He described the site to Grounds, and explained its potential to provide the private spaces that he and Margaret desired. In the same way that dominant characteristics of offspring could be predicted according to Mendelian theories, Frankel could predict the types of materials, finishes and spatial configurations from Grounds' architectural 'gene pool' that were most likely to appear in his house.

Yet in spite of this, and in spite of his extensive knowledge of the physical environment and previous experience in building houses, Frankel could not imagine the complete form of the house, or its location or orientation on the site. He had no desire to do so—that was what Grounds was for. Grounds was fully aware of the boundary between Frankel's area of expertise and his own, having previously noted that the scientists involved in the Academy of Science project were creative and well informed about art, yet incapable of abstract thought. Understanding what was expected of him, Grounds delivered the Frankels the artistic statement they wanted: with one sweep of his hand across the site plan, he mimicked the form of Cobby Street and produced the single, powerful idea that provided the concept and generated the plan form of the house. The fact that this solution inherited a number of practical limitations was not as important to Grounds—or to his clients—as was the fact that it was an exceedingly simple, iconic shape that could be developed into a house. The simplicity of that solution provided Grounds and Bischoff with a further series of challenges as they worked through the house in increasingly smaller scales to consider how to build it. The care with which this process was carried out, and the intellectual rigour that was applied to all aspects of the detailing and construction, resulted in the house becoming a finely crafted artefact.

The Frankels—and their surrogate planning consultants, John and Frances Philip—did not question the form, orientation or location of the house. Nor did they comment on its external architecture. For that, they required an architect—someone who could apply conceptual thought to the problem of designing a house and give three-dimensional form to a series of disparate ideas. It was not

essential for that process to be based on rationalism; reproducing the shape of the adjacent road seemed, to Frankel, to be as valid as any other methodology. It was the integrity of the artistic gesture that was important.

But when it came to the internal configuration of that prescribed form, they had no hesitation in questioning Grounds' judgment, and no qualms about redesigning the living areas in accordance with their own functional criteria.

It would seem that, within the mixture of aspirations and ideologies that led to the creation of the Frankel House, art was of equal value to the scientist-clients as was scientific rationality to the architects. Both the remaining Frankel houses continued to delight architects and artists for decades after they were built. When Otto and Margaret visited the Christchurch house in the 1970s, some 35 years after they had commissioned Plishcke to design it, they were pleased to find it being lived in by an architect 'who loved it and cared for it'.⁷⁵ Following Margaret's death in 1997, and Otto's during the following year, their friend and colleague Lloyd Evans was appointed executor of the will (the Frankels did not have children), and was given instructions regarding the estate. On 16 February 1999, the Frankel House was sold by public auction at Olim's Hotel in Braddon. Like their Christchurch house, it was purchased by an architect: Stephen Frith, Professor of Architecture at the University of Canberra. And, like Margaret, Frith's wife, Catherine, was a potter.

There was one final twist in the story of the Frankel House—one that will forever equate Grounds' creation with art. Evans was instructed by the Frankels that the proceeds from the sale were to go to the National Gallery of Australia in order to purchase a painting. But not just any painting; they stipulated that they wanted to donate a significant New Zealand painting to the gallery's collection. When Margaret was involved with The Group in Christchurch some 60 years previously, she had befriended and helped a struggling young artist named Colin McCahon. In the intervening years, McCahon had become New Zealand's most renowned modernist painter, with a considerable international reputation for his powerful and iconic 'biblical landscapes' in which he attempted to explore questions of his own faith in relation to the New Zealand context.⁷⁶ In 2004, with funds from the Sir Otto and Lady Margaret Frankel Bequest, the National Gallery of Australia purchased McCahon's *Crucifixion: the apple branch*, a large oil-on-canvas painting that McCahon had painted in Christchurch during April 1950—the year before the Frankels departed that city for Canberra. An intensely personal painting that depicted the artist, his family and a crucifixion scene all set within a diptych of South Island landscapes, it had been exhibited only once

75 Lloyd Evans, Handwritten notes, 4 November 1989, Frankel, Sir O. H., FAA (1900–1998), Box 15, Item E, P. 130, 2.

76 Lloyd Evans, In discussion with the author, 14 June 2009, Canberra.

in McCahon's lifetime: in *The Group* exhibition, with Margaret Frankel, in 1950. After that time, the painting had remained with the artist, in his studio, until his death in 1987.⁷⁷

The acquisition and hanging of this painting completed a number of cycles within the story of the Frankel House. New Zealand, the country where Otto and Margaret met, began their patronage of art and architecture, and spent a significant portion of their lives together, would forever be represented in Australia, the country in which Otto had achieved his considerable success as a scientist. Otto and Margaret, with some help from a fellow scientist (John Philip), had collaborated with Grounds to build a house that owed more to the freedom of artistic intuition than it did to any notion of scientific rationality—a house that, after their deaths, was sold to purchase a work of art.

When the National Gallery of Australia hung McCahon's masterwork—unseen by anyone except McCahon and his closest associates for more than 50 years—within the cavernous spaces of Col Madigan's concrete labyrinth, the cycle from private house to public exhibition was complete.

77 Deborah Hart, *Colin McCahon: Focus Exhibition* (Canberra: National Gallery of Australia, 2007), 5–7.