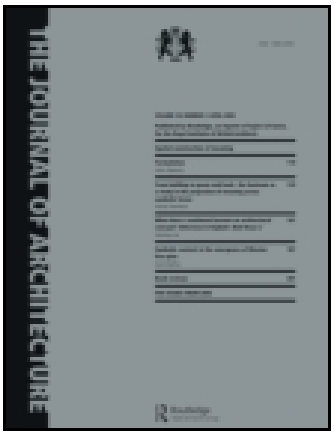
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The Journal of Architecture
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rjar20

Hendrick Petrus Berlage's villas

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Published online: 20 Aug 2006.

To cite this article: Peter Blundell Jones & Tae-Woong Kang (2005) Hendrick Petrus Berlage's villas, The Journal of Architecture, 10:5, 553-572, DOI: 10.1080/13602360500285617

To link to this article: http://dx.doi.org/10.1080/13602360500285617

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of Architecture
Volume 10
Number 5

Hendrick Petrus Berlage's villas

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Hendrick Berlage is known to architectural history mainly for his Amsterdam Stock Exchange of 1903. This is often celebrated as a proto-modernist work in a rationalist spirit, an over-simplified view, for the building had a conventionally eclectic start and was the fruit of long struggle and many revisions. The development of Berlage's architectural ideas during the period of its gestation is chronicled in a fascinating way by a series of private villas built for friends who were artists and intellectuals. Completed year by year, they run right through the 1890s, showing Berlage's changing concerns with the articulation of content, the expression of construction, the application of controlling geometry, and the development of architectural space.

Introduction

Berlage has been written into history as a structural rationalist, known world wide for his Amsterdam Stock Exchange but for little else. It was for its time a remarkably plain brick building, and all the brick arches and iron structure were proudly displayed on the interior giving the feeling that you could really sense the substance of the building. Berlage had cut away from the battle of the styles to get down to real essentials, had discovered the power of a controlling geometry, and in the process had produced an almost modern building.[1] As with most myths there was some truth in this, but also much omission and even some contradiction. The famed structural rationalism does not sit so easily when you discover that arches started to collapse and had to be propped up, and that unwanted ties had to be added to the ironwork.[2] And there is also the existence of an earlier and much more conventional design for the same building by the same author, loaded with standard nineteenth century stylistic references and indistinguishable in this from other competition entries.[3] Furthermore, at the height of his career just before the commission for the Exchange, Berlage's public lecture and statement of faith was devoted not to structural rationalism or modularity, but to 'Architecture and Impressionism', drawing parallels with impressionist painting.[4]

As often happens with architectural history, his story was selectively edited to fit an evolutionary theory about the invention of Modernism, and aspects unsuited to that theme were excised. This does Berlage a disservice by making his contribution seem too easy, sidestepping the struggles, the conflicting influences and the changes of consciousness along the way. Because of the long gestation of the Exchange, these things are not so easily traceable in that design, but are beautifully evident in a parallel series of designs for houses and villas running through the 1890s.

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1360–2365 DOI: 10.1080/13602360500285617

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Figure 1. House in Egelantiersgracht, Amsterdam (1891). (Photograph taken by Michel Claus.)

Born in 1856, Berlage studied at the Zurich Polytechnic between 1875 and 1878. In 1884, at the age of 28, he produced his first design for the Exchange as a competition entry in partnership with Theodor Sanders, and they were awarded third prize. Berlage set up his own office in 1889, and was given the commission for the Exchange by a generous and perceptive patron in 1896.[5] He began building it in 1897, and completed it in 1903. The domestic work to be discussed here falls in the period 1891–1898, the years just before and during the final Exchange design. It shows both the range of concerns he pursued as an architect and the changing balance of priorities that brought him to the forefront of architectural development at the turn of the century.

Two early houses (1891)

Two urban house fronts of the early 1890s show that he was already interested in brickwork, mixing Dutch vernacular tradition with the legacy of the Gothic Revival. The remodelling of a narrow façade in Egelantiersgracht, Amsterdam, of 1891 (Fig. 1) seems almost entirely conventional with its rusticated ground floor, symmetrical windows and ornate gable, but there are brick arches with stone springings, stone-banding marking certain courses, mouldings on the jambs with special bricks, exposed iron ties, and even a possible layering of the façade by corbelling out. The Pijzel house designed in the same year (Fig. 2) was similarly limited to a narrow urban site between party walls, which only allowed one room and a corridor per floor looking out each way, but Berlage was more adventurous with the street elevation. The only full-width room occupied the first floor front and was given a symmetrical pair of windows. The others were all asymmetrical, which Berlage seemed to relish: basement and ground floors lost volume to the entrance steps and each received a bracketed double window, while the upper two floors with a larger and a smaller room expressed them respectively in a bracketed window of reduced height and a single window on the right. The brick detailing played with the layering of the

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Figure 2. Pijzel House, Amsterdam; original drawing from the Netherlands Architecture Institute, Rotterdam (above left); photograph of 1891 (above right); photograph of 2002 (below).

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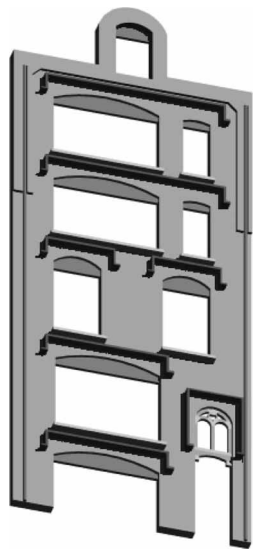


Figure 3. Pijzel House, Amsterdam; 3D façade restoration by Tae-Woong Kang.

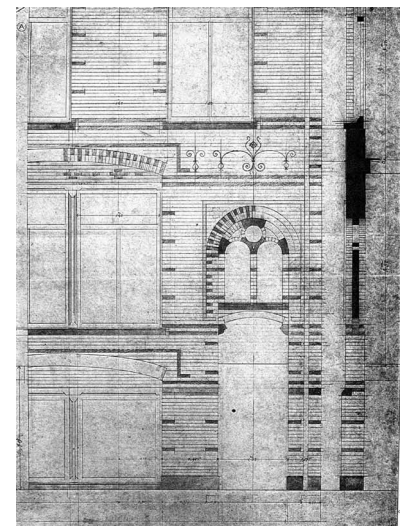


Figure 4. Pijzel House, Amsterdam; detail of elevation and its section: drawing from the Netherlands Architecture Institute, Rotterdam.

façade, with projecting hood mouldings over segmental arches, recessed tympana, and projecting vertical bands at the top of each side to embrace the downpipes (Figs 3, 4). Berlage screened off the top of the passage accommodating the entry steps with an unglazed window of almost Gothic design, the most archaic element in the whole composition. A small decorated gable over the attic dormer repeated the architectural good manners intended for the Egelantiersgracht façade, but in more muted form.

Villa van Eeden (1893)

The design of the Villa van Eeden[6] in Bussum followed closely, designed in 1892 and completed in 1893 (Figs 5, 6). This occupied a suburban setting by a crossroads with garden spaces all around, apparently intended to be seen as a free-standing entity. Van Eeden was an anglophile and enthusiast for the Arts and Crafts Movement, and he visited England in the same year, encouraging Berlage's adoption of a functional simplicity.[7] The villa shows an obvious interest in the articulation of content as found in the works of Butterfield and Webb, leading to picturesque irregularity rather than classical repose. The two primary rooms—study and dining room—formed the principal block with the highest double-pitched roof, but this faced backwards into the garden. On the west and front, two wings running at right angles were attached, each with its own gable: a wide one containing the

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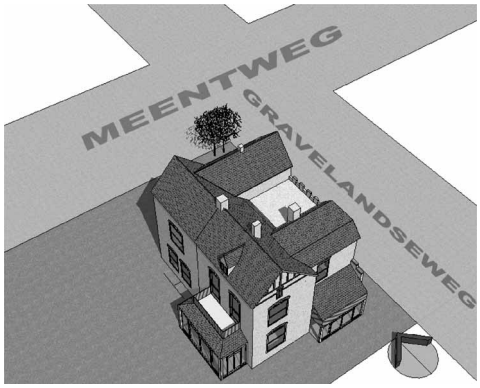




Figure 5. Bird's eye view, Villa van Eeden, Bussum (1893); restored by Tae-Woong Kang.

Figure 6. Perspective view from south, Villa van Eeden, Bussum (1893); restored by Tae-Woong Kang.

salon or drawing room to the south and a service wing to the north: these form the front of the house (Figs 7, 8). The entrance hall is set between them, with an arched porch in front and a flat roof over. Although the hall seems externally the least articulated element, it is central in the ground floor plan, and treated as a perfect square with the main doorways symmetrically ahead, its own fireplace to the left, and the stair rising to the right, with a window at the landing.

Clearly Berlage was concerned with the formal progression of spaces in the major rooms. He also offered three kinds of transitional space between inside and out: the entrance porch leading sideways to the wind lobby, the conservatory off the dining room and the verandah off the salon. Following English precedent, the fenestration is extremely varied expressing the uses of the rooms, and in a rendered house much is made of the arches over the openings. Strangely un-English is the treatment of the roof, for Berlage not only cheats over the hall with a flat area, but even crops the gable of the salon. Worse still are his chimneys, elements of primary expression for Butterfield or Webb. The one rising from the fireplaces of hall and salon projects awkwardly beside the flat roof and finishes so soon as to risk failure to draw. Far from helping to bring the composition to a climax, it would be better omitted.

For its date the house was remarkably unornamented, and the flat and round arches, shutters and half-timbering of the gables may all have been legitimate expressed construction, but the crenellation signalling the entrance can surely only be read as applied style and as archaic. Some priority had been given to the internal progression of spaces, but Berlage obviously also enjoyed the picturesque exterior massing, and it is telling that he made his own perspective from the south-east corner, suggesting this as the primary view. In his lecture *Architecture and Impressionism* he emphasised massing and silhouette as opposed to detail,

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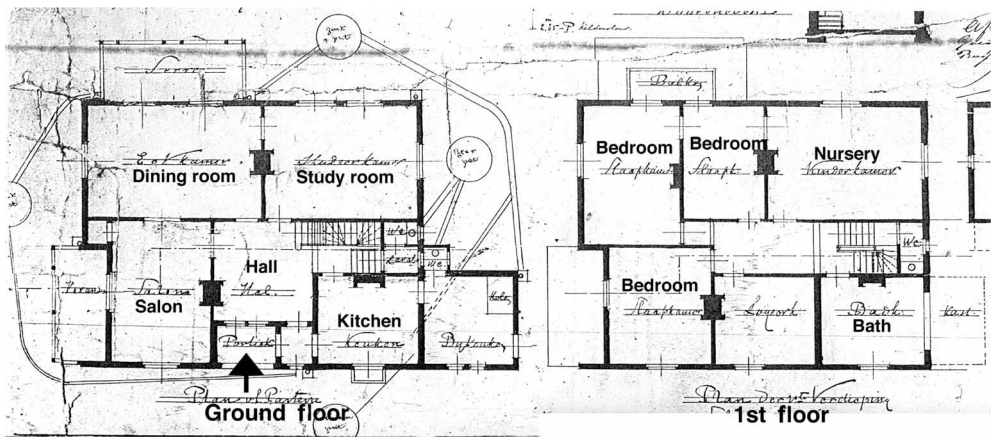


Figure 7. Plans, Villa van Eeden, Bussum (1893); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

and this visual concern ran parallel with the then current town planning ideas of Camillo Sitte, which praised mediaeval irregularity and sought to define the creation of outdoor spaces and the placing of necessary accents.[8] It seems that Berlage had understood the Puginian articulation of content and the Ruskinian taste for contingent irregularity (or Changefulness) without being able to manage it as consistently or beautifully as Butterfield or Webb.



Figure 8. Elevations, Villa van Eeden, Bussum (1893); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

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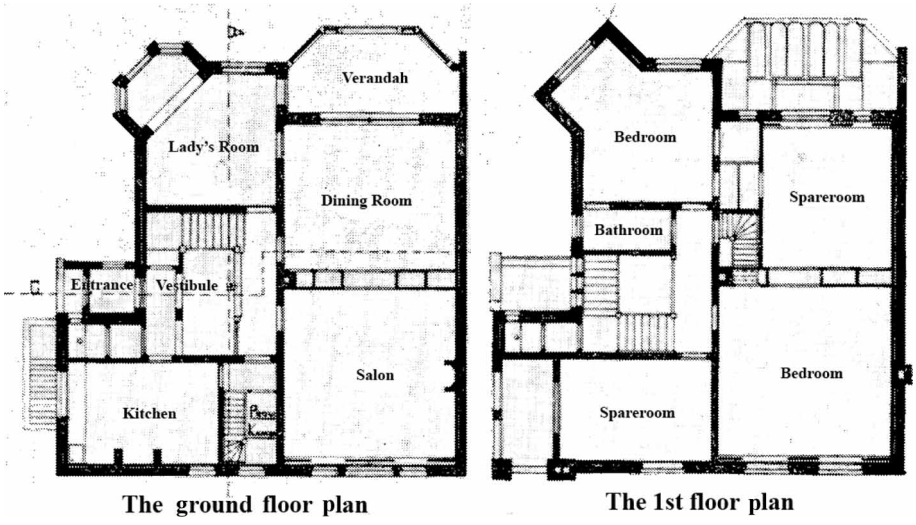


Figure 9. Plans, Villa Heijmans, Groningen (1893–95); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

Villa Heijmans (1893–5)

With the Villa Heijmans[9] in Groningen of 1893–5 (Figs 9, 10, 11) Berlage produced a much more confident-looking house to a surprisingly similar plan. The same major volume, housing the primary ground floor rooms under a double pitched roof, is accompanied by the same central square hall and two front wings, one for drawing room and one for service. But the orientation this time was different, with the main block setting a solid party wall to the west, and the optimum views across the river to the south east. This prompted Berlage to make the drawing room a corner room with a bay at 45 degrees, and to solve the roof problem with an open terrace also facing the view. The double pitched roofs of main block and service wing then create a sense of embrace to dramatise the corner position. The roofs were this time better resolved, that over the hall simply continuing the 45-degree slope of the main block. The internal progression of

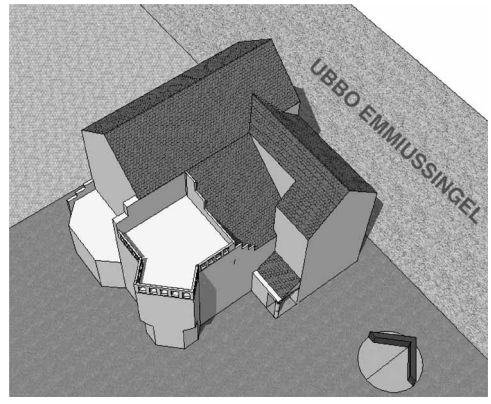


Figure 10. Bird's eye view, Villa Heijmans, Groningen(1893–95); restored by Tae-Woong Kang.

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Figure 11. Spectacular view from the Central Station of Groningen: Villa Heijmans, Groningen (1893–95), present state; photograph by Tae-Woong Kang.



Figure 12. East façade (main entrance in the middle), Villa Heijmans, Groningen (1893–95), present state; photograph by Tae-Woong Kang.



Figure 13. Detail between bay window of lady's room and bedroom on the 1st floor, Villa Heijmans, Groningen (1893–95), present state; photograph by Tae-Woong Kang.

spaces was also again a major consideration, and Berlage decided to combine the hall with the stair, creating a square within a square defined by the newell posts. Inside/outside spaces include the drawing room bay, dining room verandah and balcony over, and a first-floor loggia for the bedroom at the north-east corner.

Windows were again very varied and expressive of content, with, for example, three reducing lights to reveal the position of the stair, and now that Berlage could build in good-quality brick, he could indulge in much more brickwork detail (Figs 12, 13, 14). Arches could be flat or curved and with or without tympanum, but they tend to spring from perfectly cut stones which absorb the angle. Stone columns and capitals receive the arches of porch and loggia. The angled drawing room bay is made to corbel out to support the square bedroom bay above. There are plinth courses, delicate brick cills and mouldings that run up the sides of windows, and corbelled projections at upper corners to terminate cappings and protect gutters. Open slots give the latter more delicacy, and these are applied repetitively in other places to make brick balustrades. The brick texture enriches and transforms the surfaces in a way that prefigures the Exchange, but it also makes Berlage's own plain elevation drawings for the villa seem to belong to another building: perhaps the sheer palpability of material effect was also a discovery for him.

Villa Liesbet (1896)

Both his impressionist theories and his perspectives of his villas suggest that Berlage favoured a corner

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Figure 14. North façade (showing use of various windows), Villa Heijmans, Groningen (1893–95), present state; photograph by Tae-Woong Kang.



Figure 15. Villa Liesbet, Noordwijk ann Zee (1896), from the south-west; by unknown photographer.

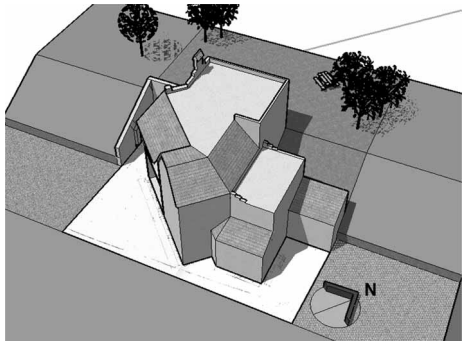


Figure 16. Bird's eye view, Villa Liesbet, Noordwijk ann Zee (1896); restored by Tae-Woong Kang.

view with dynamic massing, and he also became fascinated by the effects of the 45-degree angle in plan, which in the Villa Heijmans gave the corner drawing room and bedroom a dominant axis on the diagonal. With the Villa Liesbet[10] in Noordwijk of 1896 (Figs 15, 16, 17) he was presented with a site on a dune running approximately northeast/southwest and involving a change of level of a full storey. Berlage's reaction was to build a retaining wall following the line of the dune, then to swing the two main rooms around by 45 degrees to face south. Stepping them made both almost the same size while adding a conservatory and balcony to the one to the west — the usual inside/outside spaces; and the back ends of both rooms were chamfered off with poché cupboards to make half octagons. The space between these rooms and the retaining wall to the rear was exploited to make an unusual and dynamic hall, insinuating the main stair in the corner of the plan. Externally from the south, the villa presented a conventional pitch and gable with symmetrical fenestration, but to the north and west it appeared much more chaotic, with parapet walls and scattered windows informally following the order of the rooms. The roof, had it been visible at all, would have revealed itself as an ugly and shameless compromise left mostly flat, and again chimneys erupted more or less at random. But the spatial effects inside must have been exciting, giving a sense of reorientation at every turn.

Two designs a couple of years later, the villas Scott[11] and Toorop[12] (Figs 18, 19), show the 45-degree swing becoming a habit, always providing rooms of varied outlook, dynamic external massing, and entrance and stair halls with a degree

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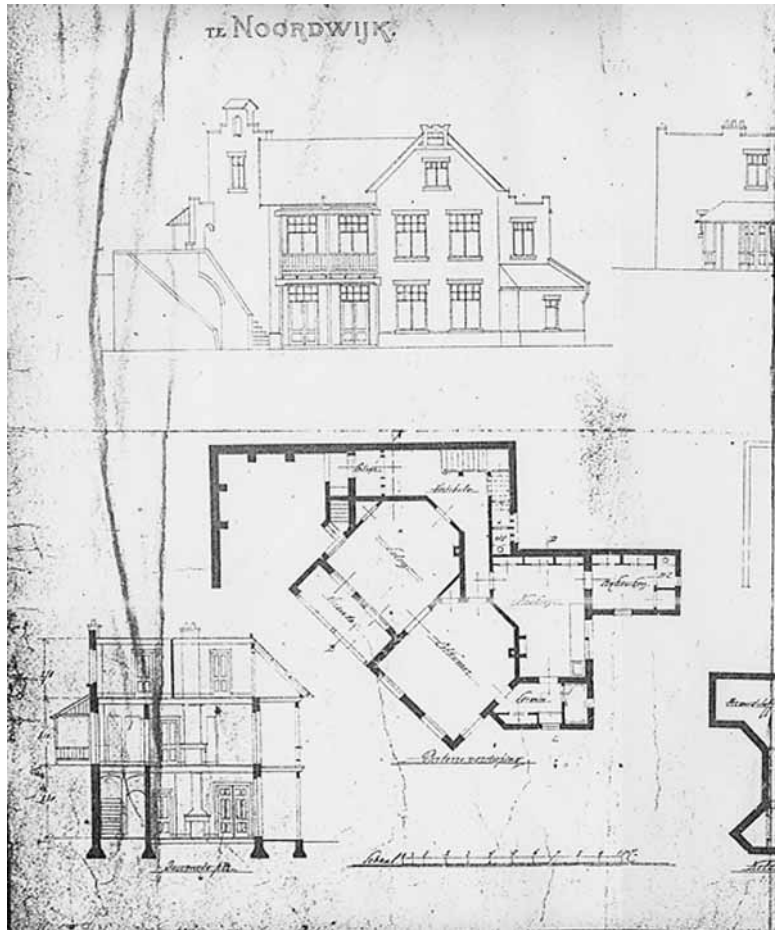


Figure 17. Villa Liesbet, Noordwijk ann Zee (1896); original drawings from the Netherlands Architecture Institute, Rotterdam.

of spatial swing. The roofs still tended to be something of a struggle, but Berlage continued to allow the plan to dominate, and made it easier for himself by departing from his formerly compulsory 45-degree pitch and allowing the roof planes to run shallower. Inside/outside spaces, fenestration following and revealing internal order and the intention of carefully detailed brickwork continued.

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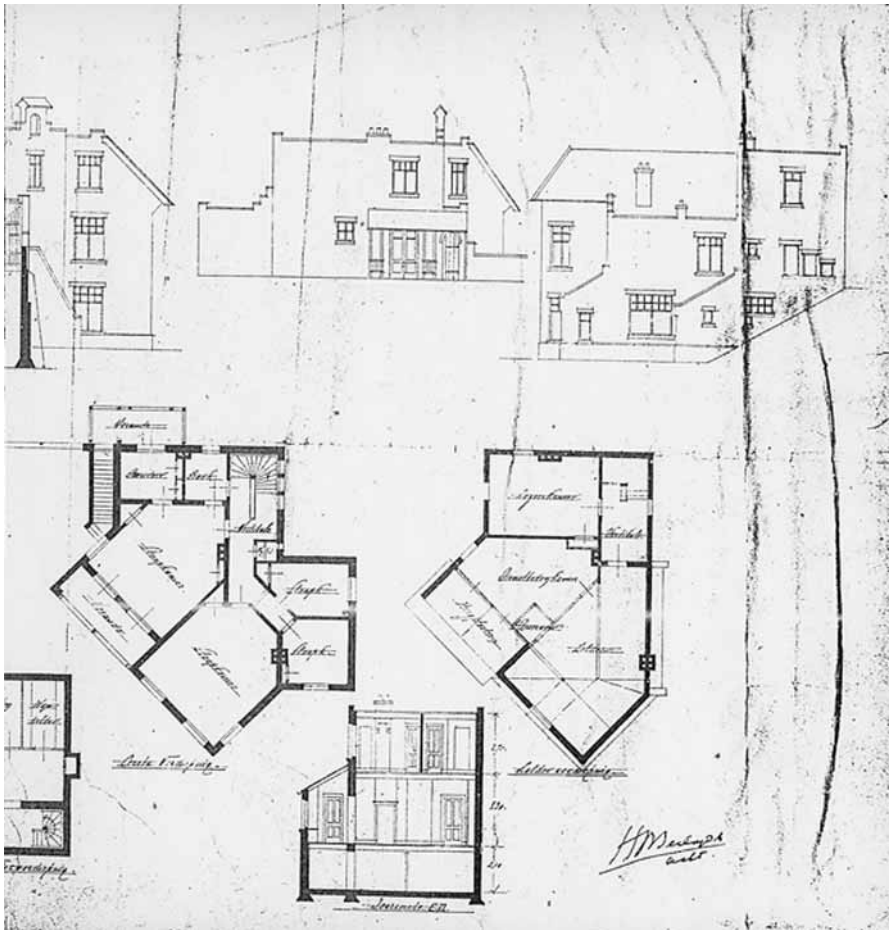
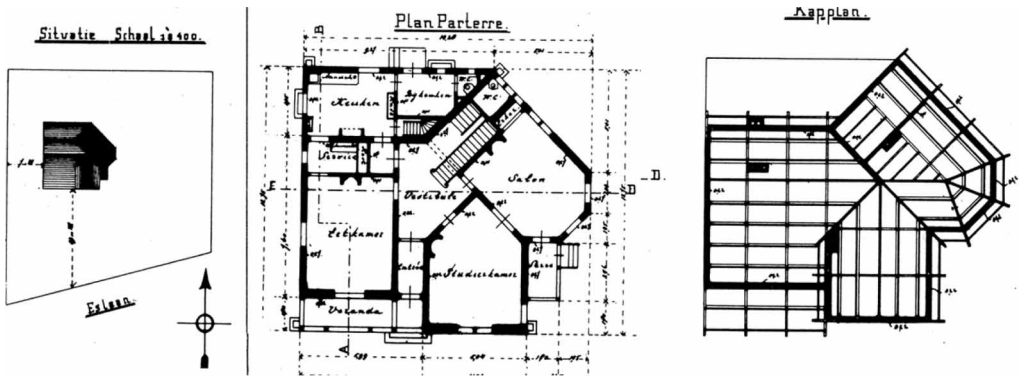


Figure 17. (Continued.)

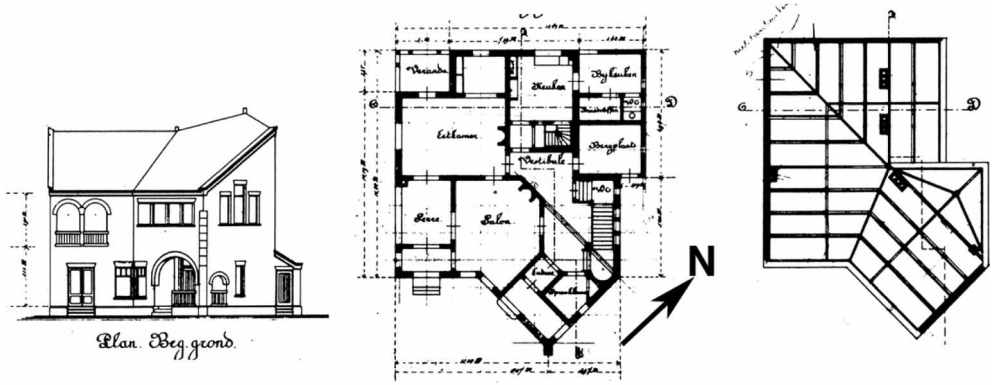
Villa Henny (1898)

The work on villas reached a notable climax in 1898 with the Villa Henny in Den Haag (Figs 20, 21, 22, 23) built for one of Berlage's richest and most sympathetic clients.[13] Here at last all his ideas came together in a single synthesis, making it a kind of little Beurs. The site was more or less square and on a corner, inviting Berlage's favourite

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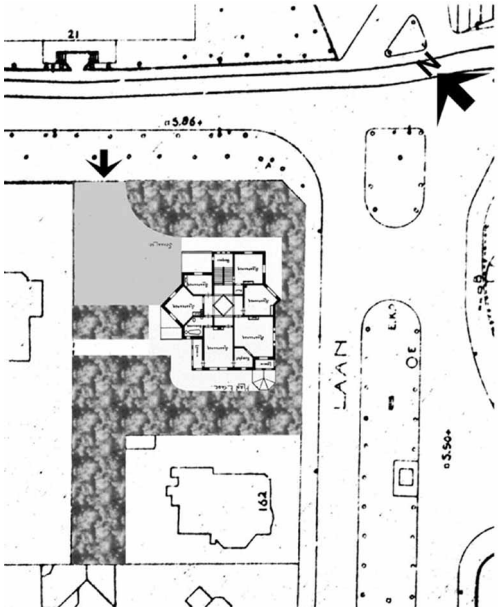


angle of view, but it was also aligned almost exactly 45 degrees off north/south, giving him every excuse to indulge his favourite angle shift. The corner rooms already had views in two directions, and the addition of projecting bays at the sides set at 45 degrees allowed middle rooms to have them as well. This made the villa more polygonal than square, but the real stroke of genius was to centre the whole design on a hall which is also both stair-landing and tower, space and substance (Fig. 24). Here Berlage reintroduced his 45-degree shift in a constructional headstand, setting arch on arch to make a square void which bears at 45 degrees on the mid-points of a larger square. In section the



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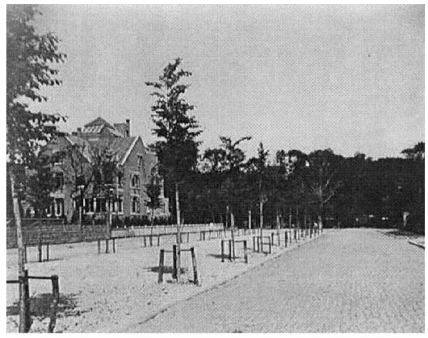




Figure 18. Villa Scott, Bossum (1898); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

square tower dominates the building, mastering the surrounding roofs and culminating in a four-part rooflight which floods light down the well via an intermediate glass screen. The rotated squares give a strong sense of centre but also disorientate the visitor, whose experience is only restabilised by the return of the stair to the north-east side. The double square was also the statement of a new architectural theme about controlling geometry, which ran through the building in three dimensions.

Berlage had been influenced by Viollet-le-Duc's ideas about proportion[14] and was also teaching with Jan Hessel de Groot, whose exposition of geometrical relationships was foundational for the Dutch Modern Movement.[15] The Villa Henny was strictly based on a module of 1.5 metres, related to the Wallformat brick size of 220 × 105 × 52.5 mm (Fig. 25). The geometrical regulation of the plan was both a spiritual matter related to Dutch Theosophy and the geometry behind all things, and it was a practical matter. The geometry also regulated the section, giving an underlying logic to the external massing which centred on the tower and set all roofs to the preferred angle of 45 degrees. Villa Henny was the first house in which Berlage sought to expose the construction

Figure 19. Villa Toorop 1st version, Den Haag (1898); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

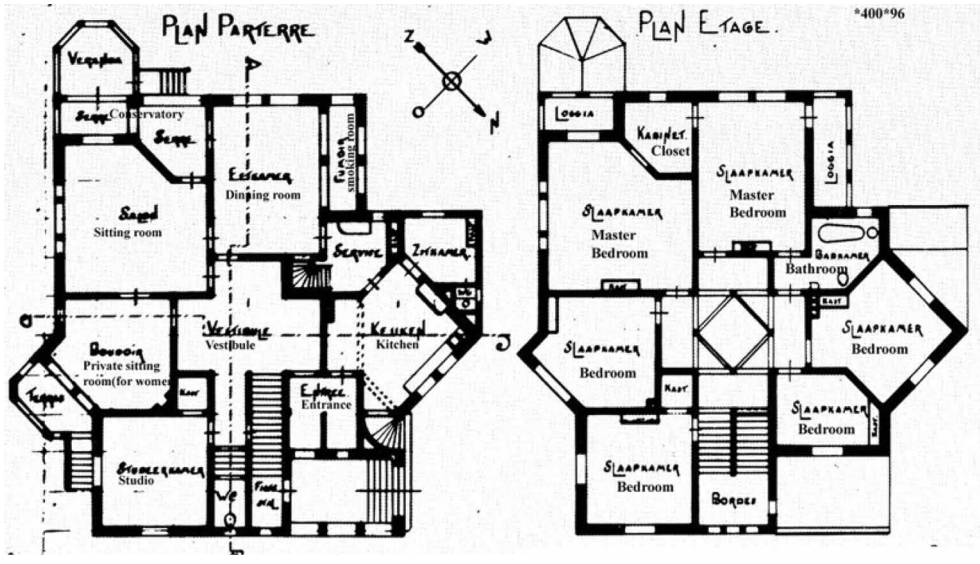
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Figure 20. Villa Henny, Den Haag (1898): site plan; a cadastral map from The Hague archive, over-layered ground plan by Tae-Woong Kang.

Figure 21. Villa Henny, Den Haag (1898): view from the south-west in 1903 (above), photograph from The Hague archive; and 2002 (below), photograph by Tae-Woong Kang.

internally, and this required accurate prediction of the position of every brick and every joint. Even the stair treads from the adjacent flight could be seen projecting through the wall. Junctions could be 'adorned' with special stone elements and bricks of different finish could be added for polychromy (Fig. 26).[16] The general effect was to celebrate a kind of 'objectivity' prefiguring the 'new objectivity' of twenty years later:[17] one could see exactly how the building was built and enjoy the rational certainty of its ordering. But as with Webb's Red House for Morris built in a world of stucco, the people of Den Haag considered Henny's naked internal construction almost scandalous.[18] Berlage was not allowed



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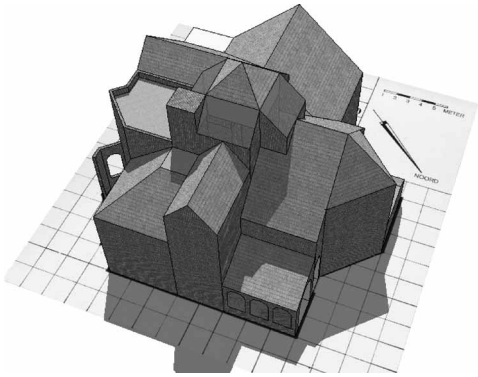


Figure 22. Villa Henny, Den Haag (1898): elevations, southwest, northwest, southeast, and northeast (anticlockwise); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

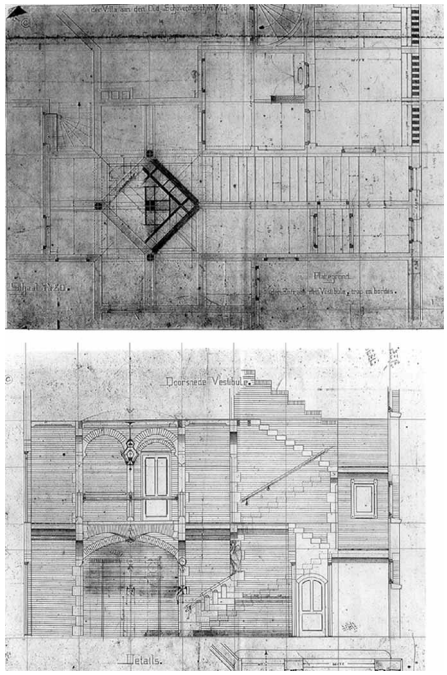


Figure 23. Villa Henny, Den Haag (1898): plans, ground-floor plan (left) and 1st- -floor plan (right); drawings from the Netherlands Architecture Institute, Rotterdam, edited by Tae-Woong Kang.

to pursue it in the other rooms, which were conventionally plastered, and this turned the hall and associated circulation spaces by contrast into a kind of inside-outside, stressing their transitional role.

One of the leading architects of the next generation, Bruno Taut, perceptively remarked that Berlage's contribution to the development of modern architecture lay in his development of a three-dimensional controlling geometry.[19] Modern though it was, this geometry also allowed Berlage to keep control of a very complex group of forms, and the Villa Henny was surely unusual for its time in the degree to which it had no back and front but was designed to be encountered from any angle. Both for its external massing and for its internal spatial progression it would surely have been a good candidate for Sigfried Giedion's Space-time concept; more convincing in fact than the Bauhaus, which was still labouring under the remnants of classical symmetry almost twenty years later. But looking back to the Arts and Crafts movement, we can find equally strong resonances, not only in the insistently 'honest' construction and stripping away of unnecessary decoration but also in the articulation of parts, the making of individual rooms, the forming of bays and other kinds of inside/outside space, and the deployment of dedicated types of window to declare what was going on inside. Berlage's triumph at the Villa Henny is surely the paradoxical combination of the two: of rational control with idiosyncratic and responsive complexity. He could have his cake and eat it.

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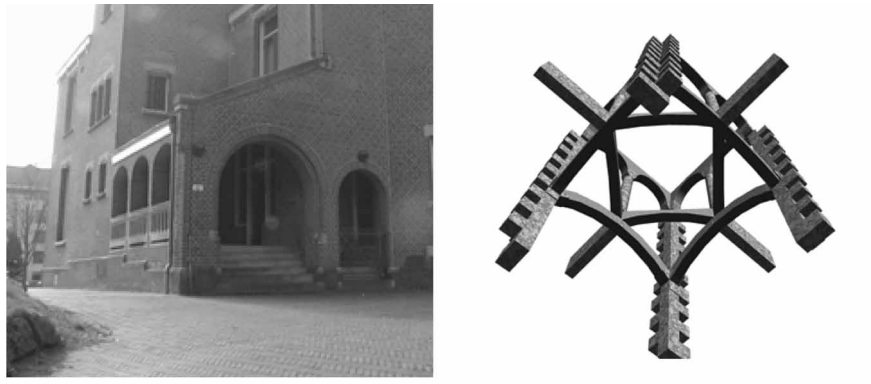


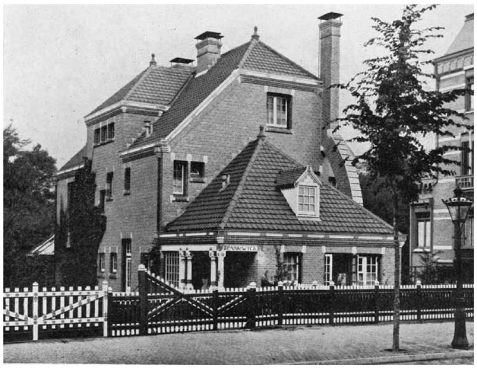
Figure 24. Villa Henny, Den Haag (1898): bird's eye view; 3D modelling by Tae-Woong Kang.



Figure 25. Villa Henny, Den Haag (1898): partial ground-floor plan (above) and section of the villa with typical module system (below); drawings from the Netherlands Architecture Institute, Rotterdam — module overlapped by Tae-Woong Kang.

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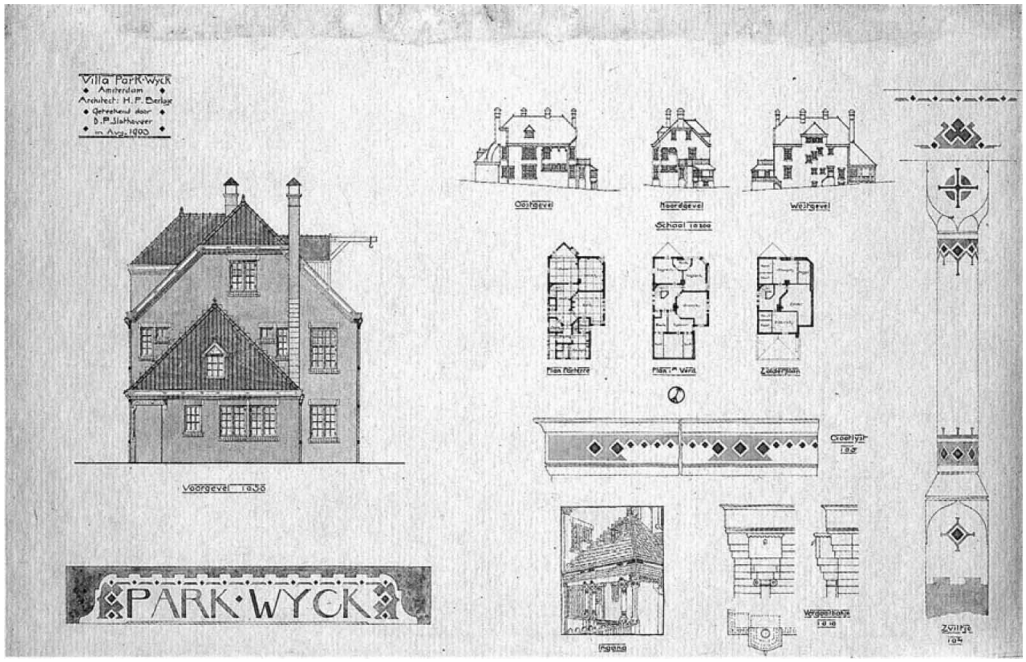
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Villa Parkwyck (1900–1)

After 1898, the success of Berlage's practice brought plenty of large buildings, and although he built several more villas none was subject to the same kind of architectural elaboration as Villa Henny: indeed, most look comparatively pedestrian, but they were well planned and built, and perhaps appropriately modest, reflecting a typically Dutch Puritanism. The Villa Parkwyck[20] at Parkwyck in Amsterdam of 1900–01 (Fig. 27) provides a suitable final example, relatively plain in its massing and overtly rectangular, though with a

Figure 26. Villa Henny, Den Haag (1898): sequence of entering, from left above anticlockwise, 3D model of the hall structure; photographs and 3D modelling by Tae-Woong Kang.



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Figure 27. Villa Parkwyck, Amsterdam (1900): by unknown photographer.

Figure 28. Villa Parkwyck, Amsterdam (1900): presentation drawing, from the Netherlands Architecture Institute, Rotterdam.

hint of movement in the hall due to a couple of canted walls which also give an octagonal end to the dining room. Here again Berlage indulged in much careful brick detailing both inside and out, but the whole thing is much more sober apart from the astonishing flying chimney rising from the kitchen. A presentation drawing is rather telling in what Berlage chose to show: the end elevation as seen from the street, the other elevations and plans small but with the module drawn in, a perspective of the entrance porch—the most important inside outside space—and details of its painted timber columns and corbelled brickwork (Fig. 28).

Conclusion

During the 1890s Berlage took the design of villas as an experimental laboratory for his architecture, and an evolutionary pattern is evident. The house fronts of 1891 show a transition away from traditional façade-making through functional asymmetry and elaboration of brick detailing. The Villa Eeden shows Berlage's growing interest in the articulation of forms and openings, coupled with an interest in progressions of space in plan, but at the expense of a poorly resolved roof. The choice of the corner as the ideal view hints at a rotation in space that is more firmly achieved in the Villa Heijmans with its 45-degree bay. Here brick detailing also returns, exploited both for its modular quality and material essence. The ready adoption of 45-degree plan shifts in three subsequent villas — Liesbet, Scott and Toorop — is unusual for the time, and heralds the more radical development of the Villa Henny, whose rotated squares in plan make it almost polygonal.

Here, the whole constellation of ideas comes together in a new synthesis, with modules in plan and in section which rhyme with the constructional system, and a lively rotation of spaces which departs from traditional concepts of front and back and prefigures the space-time continuum of Giedion. It was this same combination of geometrical control and tactile constructive material that produced the sense of objectivity which made the Amsterdam Beurs such a progressive building. After 1900 Berlage had established his modus operandi and had enough large projects on which to expend his ideas, so the later villas are quick essays in an established manner.

Notes and references

1. Banham, R., *Theory and design in the first machine age* (1st MIT Press paperback ed., Cambridge, Mass., MIT Press, 1980), pp. 139–140.
2. Jan Molema, 'Berlage's Beurs–concept and method', *The Journal of Architecture*, 4 (Summer, 1999), pp. 216–217.
3. The municipality of Amsterdam held an international competition for the new exchange in 1884, and H. P. Berlage and Theodor Sanders were awarded third prize. Refer to Guido Hoogewoud, 'De Amsterdamse Beursprijsvraag van 1884' in Kees Broos, Pieter Singelenberg, Ed Taverne, eds, *H. P. Berlage 1856–1934: Een bouwmeester en zijn tijd* (FIBULA-VAN DISHOECK, BUSSUM, 1975), pp. 353–354.
4. In fact, the text was delivered in Rotterdam in November, 1893, but it was published in 1894 in the journal *Architectura* (2, June, 1894). Refer to I. B. White, 'Introduction' in Pieter Singelenberg, ed., I. B.

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White and Wim De Wit, transl., *Hendrick Petrus Berlage: thoughts on style, 1886–1909* (Getty Center for the History of Art and the Humanities, Santa Monica, CA., 1996), p. 17.

5. M.W.F. Treub, Radical, was appointed Alderman of Amsterdam in 1896. Because Berlage was a follower of the Liberal party and as such the very man to present Treub's political ideas, Treub took on Berlage as an architect for the new exchange. Refer to Werf, J.v.d., *Beurs van Berlage* (Amsterdam, ARCHITECTURA& NATURA PRESS, 2001), p.7.
6. Willem van Eeden (1860–1932), who was the brother-in-law of Albert Verwey, was a scholar with progressive ideas. He founded a literary periodical called *De Nieuwe gids* with A. Verwey and Willem Kloos in 1885. Through it he unfolded his new social ideas and introduced modern authors. As a physician and chemist, he also practised medicine at Bussum later. Refer to Eeden, Frederik Willem van, in *Encyclopædia-Britannica*, http://www.britannica.com/eb/article?eu=32599 (accessed November 13, 2002).
7. In 1888, Robert Dohme published a book about the English house, *Das Englische Haus: Eine kultur– und baugeschichtliche Skizze.* Here, he introduced the idea that the English house was 'comfortable', 'convenient' and 'cheerful'. Refer to Polano, S., *Hendrik Petrus Berlage, complete works* (New York, Rizzoli, 1988), p. 128.
8. Collins, George R, *Camillo Sitte and the birth of modern city planning* (Phaidon Press Ltd, London, 1965).
9. The client was Gerald Heijmans, who was a philosopher and professor at the University of Groningen. In 1886, he introduced psychophysics by Gustav Theodor Fechner and the theory of Empathy by Theodor Lipps to the Netherlands with an article, *De plaats die de bouwkunst in de modern aesthetica bekleed* ('The place which architecture holds in the modern aesthetic'). While designing the villa, 1894, both Heijmans and Berlage published essays, *Die Gesetze und Elemente des Wissenschaftlichen Denken* ('The laws and elements of scientific thinking') and *Bouwkunst en impressionisme* ('Architecture and Impressionism') respectively.
10. The client for the villa was Mrs. Van Vloten, who was the mother-in-law of Albert Verwey. Verwey was the husband of Berlage's sister-in-law.
11. Mr. E. W. Scott commissioned Berlage to design the Villa Scott.
12. The client for the villa was Jan Toorop. He was a Dutch Impressionist, Symbolist and Art Nouveau painter. He was involved with the Villa Henny as both a coordinator of colour and painter.
13. Carel Henny was one of the best clients Berlage had during his whole career. The relationship between them started in 1894 when Berlage was commissioned for an office for 'De Netherlanden van 1845' in The Hague, and Carel Henny succeeded his father as a director. Marjan Boot claims that Carel Henny was in total sympathy with the new movements in the arts, architecture and management. During forty years, Berlage was commissioned for seven office buildings and two villas by Carel Henny. With Henny's complete trust Berlage was able to make his architectural experiments in the villa.
14. As a matter of fact, the use of a geometrical method in architecture was general in the middle of nineteenth century in Holland. At that time, Dutch architects had seen the advance of scientific thinking in which it seemed that matter overwhelmed the spirit in a paradigm shift. In this atmosphere, young architects had lost direction and were looking for a way to overcome the problem. They followed the theosophical approach, and this was related to a consideration of geometry by P. J. H. Cuypers, who was influenced by Viollet-Le-Duc, and his students, J. L. M. Lauweriks, K. P. C. de Bazel and H.J.M. Walenkamp. P. J. H. Cuypers spread the

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seed of the geometrical aesthetic in Dutch architecture which derived from Gothic Revivalism, but owing to a difference of religion and architectural standpoint Berlage himself was influenced by Cuypers' students, not Cuypers himself. We do not know precisely when Berlage turned his attention to geometry, but there were two possible sources at the end of the nineteenth century. One was J. L. M. Lauweriks's book (*Egypt and her pyramids*) which discussed the Geometry of the Pyramids. The other was Viollet-le-Duc's geometry and proportion theory published in 1896, the same year Berlage was commissioned for the new exchange.

15. He was also influenced by Jan Hessel de Groot, who taught at the Quellinus School in Amsterdam with Berlage. De Groot was an apostle of current geometric theory and published a book, *Triangle in the design of ornaments*, in 1896. Until Berlage left this school because of pressure of work occasioned by the new exchange in 1896, de Groot could have influenced him a lot in terms of theoretical background. Refer to Somgelenberg, P., *H. P. Berlage IDEA AND STYLE: The Quest for Modern Architecture* (Utrecht, Haentjens Ekker & Gumbert, 1972), p. 107.
16. 'Ornament is the adoration of the joint': Louis Kahn.
17. The 'new objectivity' was translated 'nieuwe zakelijkheid' in Dutch. The term 'nieuwe zakelijkheid' was also generally regarded as a synonym of 'nieuwe bouwen' (new building). Both Dutch terms refer to Dutch functionalism in a broad sense. The 'new objectivity' in the Netherlands was started by Kromhout and Brinkman in Rotterdam in 1920. They founded a club, Opbouw, in which architects and artists thrashed out various ideas. J. J. Oud, Van Tijen and Van Eesteren joined the club later. For more detail, see Dijk, H.v., *Twentieth-Century Architecture in the Netherlands* (Rotterdam, 010 Publisher, 1999), pp. 66–68, and M. Bock, 'What was "Nieuwe Bouwen", and how new was it?' in *The Nieuwe Bouwen: Previous History* (Delft, Delft University Press, 1982), pp. 6–22.
18. For an analysis of Webb's Red House, 1859, see Peter Blundell Jones, 'More a Poem than a House', *The Architects' Journal* (15th January, 1986).
19. 'He was probably the first to place the horizontal and vertical surfaces of a building under one definite law, thus adhering most consistently to the new aesthetic claims, which exacted that the beauty of a building should not be judged by its outside appearance and individual parts, but only after having ascertained that the disposition of its apartments, walls and openings were entirely in accordance with the regulations definitely laid down for the whole.' Quoted from Taut, B., *Modern architecture* (London, The Studio Limited, 1929), p. 70.
20. The client for the villa was Leo Simons, who was a director of an association for 'quality and inexpensive reading' (Het Maatschappij voor Goeden en Goedkope Lectuur).