6 The Rijksmuseum and the City

A Hundred Years of Planning for Museumplein Surroundings

Cor Wagenaar

Built on the edge of Amsterdam's seventeenth-century canal ring, the Rijksmuseum has always formed the transition between the historical centre and the urban extensions that began in the late nineteenth century. For obvious reasons, the museum was designed to face the existing city, but the municipal authorities ordered the construction of a stately passageway through the building to the planned urban extensions. When the Concertgebouw (Concert Hall) was erected some distance away from the museum, this defined an open space between the two buildings, which later became known as Museumplein (Museum Square).

This chapter focuses primarily on that square, but also discusses the gardens around the museum. They were intended as part of a *Gesamtkunstwerk*, in combination with the building, and designed to modulate the transition to the public space around them. The gardens are mostly on the Museumplein side of the building, although successive expansions have eaten away at them. The gardens on this side have posed problems, but the greatest difficulties have been with the layout of the square itself. Over the years this problem seems to have developed into a national urban planning trauma, a trauma which may now finally have been laid to rest. We must hope that the latest measures will prove to be a happy ending for this 'symbol . . . of confusion and malaise in Dutch urban planning', as Ed Taverne, historian of architecture and city planning, described Museumplein in 1990: 'The victim of a series of disparate and conflicting visions unleashed on it without the slightest historical awareness.'[1]

He was not alone in this opinion. Both earlier and later authors have seen Museumplein as a 'gaping, ragged mouth wailing for help' (in the 1940s).[2] It acquired the sobriquet the 'Square of Plans', as well as the 'Square of Missed Opportunities' (in the 1990s).[3] In 2000, a year after the opening ceremony for Sven-Ingvar Andersson's 'definitive' plan, journalists raised a ruckus about Museumplein's material disrepair (broken street furnishings and lighting) and the failed lawn, which became an impassable pool of mud each time it rained.[4] Will it *end* the never ending litany? Will the recently approved revamp of the square be embraced as a new outrage and breathe new life into the long tradition of aggrieved protest? And will the Rijksmuseum finally be embedded in the urban context that it deserves, the setting it has awaited for over a century?

Luxury Development, Park or City Square?

The origins of what is now called Museumplein go back to an extension plan presented by J.G. van Niftrik in 1866, almost 200 years after Amsterdam's previous period of major expansion. Three years earlier, an architecture competition had been held for a new Rijksmuseum (**6.01**). Even though no feasible plan had emerged, Van Niftrik decided to reserve a fitting location for the new building: a large, round plaza near Vondelpark, serving as a bridge between that green oasis and the densely built-up city centre. Although Van Niftrik's extension plan proved much too expensive and was scrapped in 1868, the Rijksmuseum was ultimately shifted only a few dozen metres further east. As Van Niftrik had anticipated, it became part of the ring surrounding the seventeenth-century city. The idea of a large open space

6.1 J.G. van Niftrik, extension plan for Amsterdam, 1866.

6.2 P.J.H. Cuypers, plan for Museumplein showing placement of Rijksmuseum, 1876.

6.3 Public Works, urban plan for the Museumplein area, 1877.

6.4 J. Kalff, extension plan for Amsterdam, 1876.

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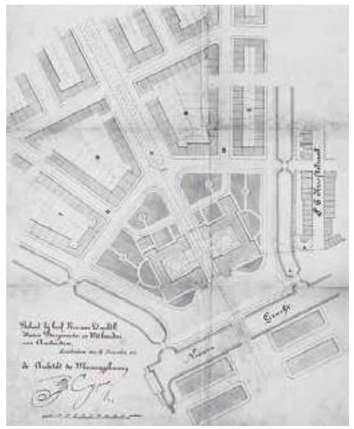

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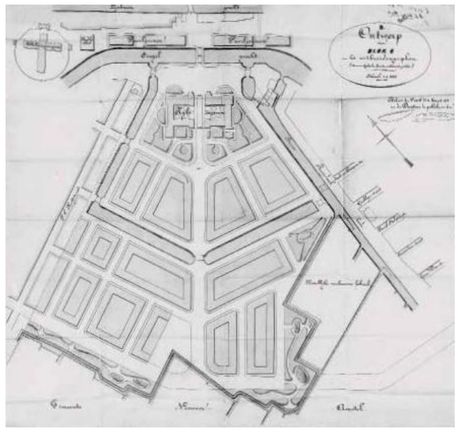

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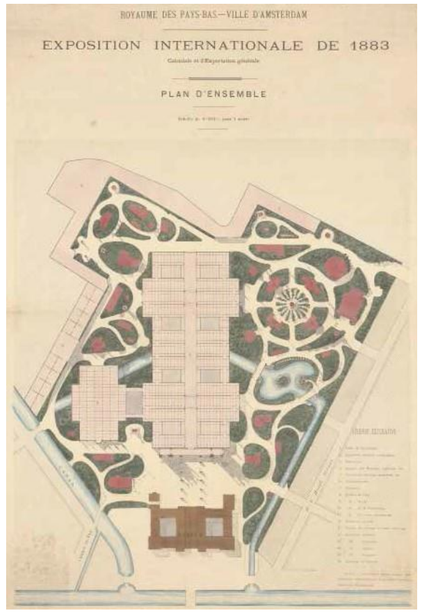

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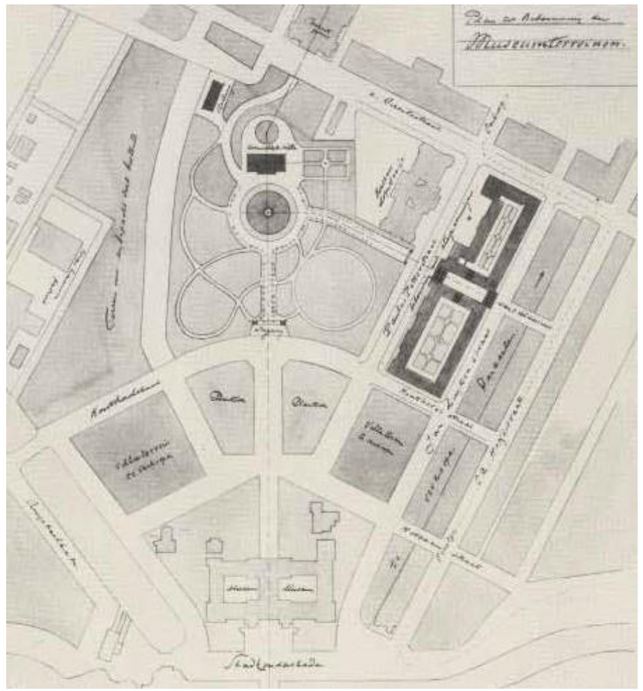

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6.5 Map of the International Colonial and Export Trade Exhibition on the Museum Grounds, 1883.

6.6 E.H. Gugel, development plan for the site behind the Rijksmuseum, 1891.

6.7 Alternative plan by Cuypers and Jacob Ankersmit, 1891.

6.8 H.P. Berlage, development plan for the museum grounds, 1895-1896.

6.9 H.W. Beyerinck, the site of the later Museumplein, looking out from an upper room at Ruysdaelkade 39 over the ice rink and racetrack towards the recently completed Concertgebouw, 1887.

next to the new building was also put into practice; here lie the roots of today's Museumplein. Ten years after the first competition, Cuypers won the second one, and that same year, 1876, saw the driving of the first pile (**6.02**).

To accommodate another surviving scrap of Van Niftrik's plan, Cuypers had to replace the monumental entrance he had envisaged with a large passage through the building. This was deemed necessary to create a direct route from the city centre to the planned southern districts, by way of Spiegelstraat, a new bridge, and the passage through the museum. It was a thorn in the side of the architect and the museum directors, but the city insisted. When the Rjiksmuseum opened its doors on 13 July 1885, there it was: a 40-m-wide arterial road straight through the building. The eventual purpose of this road was to provide access to the planned districts in the south of the city and possibly connect to through roads to Utrecht and The Hague (**6.03**). But for the time being, the landscape behind the museum was untouched, apart from widely scattered workshops and factories barred from the city centre, such as the Koninklijke Fabriek van Waskaarsen (Royal Wax Candle Factory). The area was rarely used as a park or public garden, although in 1883 it accommodated the Colonial Exhibition (**6.05**). Jaap Eden wrote ice skating history in 1893 by winning the sport's first world championship in this area, on a rink that would remain there for quite some time.

For many years, it remained an open question whether Van Niftrik's ideal of a large green space would stand the test of time. J. Kalff, Van Niftrik's successor, was eager to take advantage of the private building sector (**6.04**). His plan did nothing with the site on the far side of the Rijksmuseum (from the perspective of the city centre). The first step towards the square as we know it today was the construction of the Concertgebouw. The opening of the museum fuelled the idea that Amsterdam was ready for its own concert hall, and an architecture competition was announced that same year; the winner was A.L. van Gendt. The organizers of this initiative chose a location directly linked to the new museum. The Concertgebouw was to have a main entrance facing the Rijksmuseum and another entrance on the side where they planned a luxury housing development. From that moment on, the two buildings defined the space we now call Museumplein. What was to be done with it?

The first question to excite public debate was whether it was necessary or desirable to leave this large expanse of land undeveloped. E.H. Gugel, a professor of Architecture at Delft University of Technology, drew up a plan (**6.06**) in 1891 at the behest of the Amsterdam city authorities which called for most of the area to be built up. This prompted Cuypers (**6.07**), who was on the city council at the time, and Jacob Ankersmit Jr, another council member, to put forward an alternative plan that left most of the area untouched.

The *Bouwkundig Weekblad* (Architectural Weekly) protested what it saw as the ill-fated union of a luxury residential development and a venue for public events. The result, it was argued, would be a 'highly unsavoury neighbourhood';[5] If things went on in this way, the magazine continued, the city would never escape its impasse, which resulted from poor urban planning and the fact that most new arrivals came from the lower classes. This yielded new buildings that were 'with a few exceptions, monotonous and ugly'.[6] Public buildings, a time-tested method for enhancing the character of a district, therefore tended to be built in the old city rather than the new districts. The magazine was no more enthusiastic about the alternatives to leaving an open space between Concertgebouw and Rijksmuseum (**6.08**). If villas were spread loosely over the site, the result would never be a suitably dignified, impressive cityscape. But even the much more appealing strategy of

building rows of villas like those in Berlin's Tiergarten district was unlikely to lead to a satisfactory outcome. Furthermore, potential buyers would have formidable alternatives: homes in breathtaking landscapes less than a half-hour away by train. This stalemate between the two visions for the area lasted more than ten years (**6.09**).

In the meantime, a third temple of culture was erected there: the Stedelijk Museum opened in 1895. Conceived as a home for contemporary art, it also held Rembrandt's *Night Watch* from 1898 to 1906, because at the Rijksmuseum the painting could not be exhibited under adequate lighting conditions. The Stedelijk faced not the green but Paulus Potterstraat. In 1902, Cuypers' alternative plan was adopted after all, and from that time onward it was clear that the area behind the Rijksmuseum would not be filled in with buildings. This marked the true beginning of the struggle over the square that was never meant to be a square, the public garden caught in a tug-of-war between competing visions. Was it a park, or a sports field, or a site for public events? Was it a major thoroughfare, or a secondary route? The only assumption that was generally accepted without reservation all those years was that it was a prime location for a cluster of major cultural attractions.

Cultural Hub, Traffic Machine, or Both?

If Cuypers had hoped that by carrying out his original plan he could root the museum more firmly in the city and give it the grandeur he sought, he must have been disappointed. The large, green space he had incorporated into his plan, which included the sports field with the skating rink (**6.10, 6.11**), became less and less of a forecourt for the Rijksmuseum and more and more of a leftover area in back of the building. The gardens he had designed with Victor de Stuers did little to change this situation. Their landscape design called for a number of 'period rooms' in the 'old Dutch Style', an idiom that the designers had distilled from the various garden styles found in the Netherlands, which offered enough variety to give each of the 'outdoor galleries', as the gardens were called, its own personality. These outdoor galleries formed the scenery within which fragments of historic architecture were exhibited.

When the museum was expanded on the Museumplein side, that side became more clearly defined as the rear. The first Drucker extension was built in 1909 and the second in 1916. These did not help to transform the Museumplein side into a grand entrance; if anything, they made it seem even more like the back of the building, thus defining the square as a second-class area. The Stedelijk, too, turned its back on Museumplein, and the Concertgebouw was too far away and too small to have a decisive influence on the character of the square. A symmetrical arrangement along an axis extending from the passage through the Rijksmuseum, accentuated by stands of trees on either side, gave the space a clear shape but failed to integrate the square with its surroundings.

The first opportunity to rescue Museumplein arose in 1928, with an architecture competition for an opera house there, the Wagneropera. Naturally, the entrants made various proposals for redesigning the square. The winner was J.F. Staal, whose design incorporated the Wagneropera – the fourth cultural monument of national significance on and around the square – into an urban plan that reduced Museumplein to manageable proportions (**6.12**).[7] The planned opera house, a large complex that included restaurants and cafés, would have blocked the old line of sight to the Concertgebouw and emphasized the axis extending from the passage through the Rijksmuseum. The plan unleashed a flood of counterproposals that

6.10 Rijksmuseum viewed from Paulus Potterstraat, 1897.

6.11 Rijksmuseum viewed from the skating club grounds, 1906.

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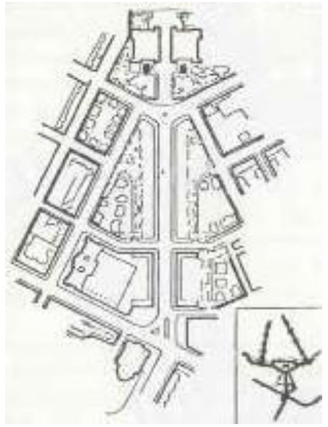

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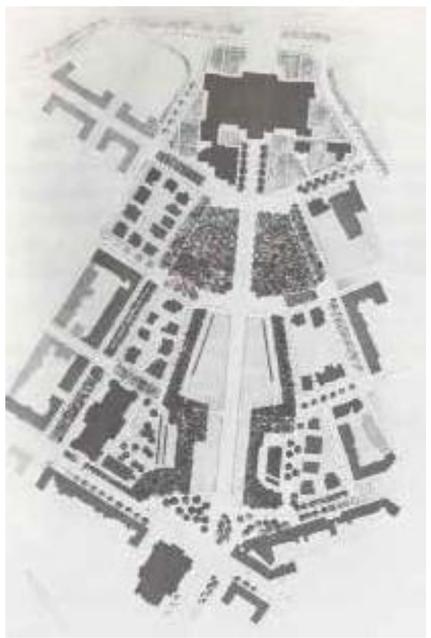

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6.12 J.F. Staal, development plan for the museum grounds, 1925-1928.

6.13-14 J.M. de Casseres, C. van Eesteren, C. Karsten and B. Merkelbach, development plans for the museum grounds, 1928-1929.

6.15-16 Development plan by the Department for City Planning, based on a design by Van Eesteren, 1951. Current situation (**6.15**). Provisional development plan for Museumplein (**6.16**).

continued for weeks. C. van Eesteren, the head of the Department for City Planning, who was responsible for designing Amsterdam's *Algemeen Uitbreidingsplan* (General Extension Plan; AUP) collaborated with J.M. de Casseres (**6.13, 6.14**), C. Karsten and B. Merkelbach on an alternative design for the square that integrated it into the traffic plan for the city as a whole. But this design, like Staal's, was shelved and forgotten.[8] For the next few decades, almost no changes were made to the square at all, aside from the damage done by the German occupiers in the process of building five bunkers there.

What Van Eesteren had failed to do to 1928, he accomplished in 1952: a new plan for Museumplein was set in motion, one that harked back to his 24-year-old counterproposal (**6.15, 6.16**). The objective was to transform Museumplein from a 'muddy, sloppy playing field with bunkers' into 'our country's foremost cultural centre'.[9] The presentation of this old proposal in new garb inspired a number of competing designs. A. Komter came up with an alternative plan in which the road did not run straight through the square but along the east side, and Staal's widow, Margaret Staal-Kropholler, put forward a version of her late husband's original plan, adapted so that it too allowed for a through route on the east side.[10]

Van Eesteren presented his proposal in two parts: a 'provisional construction plan' and a 'future construction plan'. The first came before the second but addressed only the most urgent issue: providing access to the city centre for motor traffic. This provisional plan routed a wide flow of traffic over the middle of Museumplein towards the Rijksmuseum. For a long time, this route would remain the shortest motorway in the Netherlands. The onrushing cars had to veer off to the left or right as they neared the passage through the museum, which had been closed to motor traffic since 1931. On the other side of the museum, the axis of this route joined with De Lairessestraat, which led to the motorway to The Hague. Van Eesteren left the option open of building a terminal underneath this axis for the railway line to Schiphol Airport. For the time being, there was a bus connection, and KLM opened a bus station on the square. Van Eesteren's future construction plan, like Staal's plan, involved making the square much smaller, in this case by filling it with two mammoth cultural institutions. The provisional construction plan was carried out, and for the next 40 years motor traffic dominated the central part of Museumplein. The plan for the future was cast aside.

In the late 1970s, Dutch Railways (NS) set off fresh controversy with a plan to extend the Schiphol line, which came from Leiden by way of the airport, to an underground terminal next to the Rijksmuseum. Even though serious damage above ground could be averted with a tunnel underneath the Boerenwetering canal, the plan was seen as an example of what the Dutch called *cityvorming*: aggressive, overreaching urban renewal. It called for fewer homes and more space for offices, banks, hotels, restaurants, and cafés. The press coined the term 'Manhattan effect': 'If this NS fantasy becomes a reality, then there is reason to fear that Museumplein and its surroundings will literally be handed over to the highest bidder.'[11] A massive office block that had recently been erected in Banstraat, behind the Concertgebouw, became the symbol of this nightmare scenario.[12] Critics saw the proposal as a misguided response to the emergence of a suburban way of life 'characterized by a maximum need for movement'.[13] As they saw it, the terminal would only encourage continued flight out of the city, which had lost 100,000 inhabitants in barely ten years. The ultimate decision was to build a railway ring around the city, as proposed decades earlier in the AUP, and to extend the Schiphol line to Amsterdam Central Station along the west side of the ring.

6.17 Museumplein with the Rijksmuseum, viewed from De Lairessestraat, 1951.

6.18 Aerial photograph of Museumplein, 1971.

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Although the objective was still to fill Museumplein with cultural landmarks, not much progress was made in that direction for some time. In 1954 the Stedelijk had opened a small extension, which again lacked an entrance facing the square. The first major addition was the Van Gogh Museum, built in 1973; four luxury houses had to be demolished to make room for it. Starting in 1986, Villa Troostwijk housed the short-lived Museum Overholland for a few years, until it closed in the 1990s. A year later, the new extension of the Concertgebouw, designed by Pi de Bruijn, opened its doors. From then on, the building's main entrance no longer faced the Rijksmuseum, but was oriented towards an area on the side that had been renamed Concertgebouwplein. Museumplein thus remained a leftover space between the backs of buildings, with the country's shortest motorway still running through its heart. The passage through the Rijksmuseum was still exclusively for pedestrians and cyclists. In 1986, a proposal for a tram line through the passage ran afoul of protests by neighbourhood residents.

Dutch Landscape

In 1988, *NRC Handelsblad* organized a competition that was the first in a series of attempts to solve the Museumplein problem once and for all. Although none of the 200 entries were usable – in John Körmeling's plan, for instance, the country's shortest motorway also became its widest – the initiative succeeded in bringing the issue to the forefront of public attention. In 1989 the Stichting Museumplein (Museum Square Foundation) took the lead, asking Ed Taverne to analyse the

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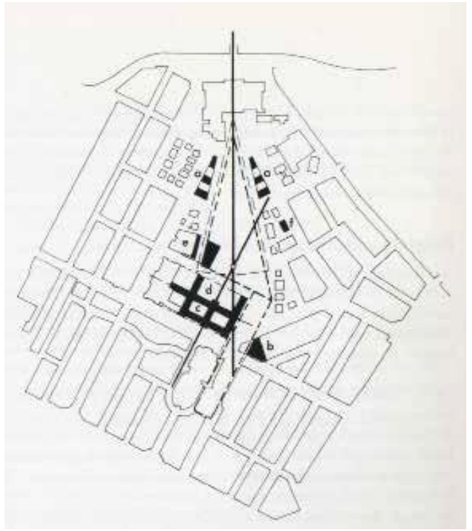
problem and Carel Weeber to come up with a design (**6.19**). Taverne concluded that Museumplein had originally issued from a combination of the general nineteenth-century pursuit of urban modernism (Vienna had been one source of inspiration for the Van Niftrik plan) and an approach typical of Amsterdam, namely the reflection of the old city across the canal ring. He went on to advocate a 'visual confrontation with the new conditions of the metropolis', making reference to Paul Virilio.[14] The danger, he warned, was 'losing one's way in dated neo-sixties-style fantasies of the biggest living room in the Netherlands, which inevitably lead to jumble-sale-style fairgrounds'.[15] Carel Weeber took this advice to heart, but his development plan excited very little enthusiasm.

The city authorities ordered several studies of the problem in 1990 and followed up in 1992 with a policy document laying out basic principles. Museumplein had to remain suitable as a site for major events. The lines of sight had to remain open, and any new facilities there would have to be placed along the edges. The district council established an advisory council for city planning consisting of Rein Geurtsen (city planning expert), Alle Hosper (landscape architect) en Maarten Kloos (director of Arcam, Amsterdam Centre for Architecture).

These advisers put forward the Danish landscape architect Sven-Ingvar Andersson to redesign the square (**6.20**). From 1993 to 1996, Andersson, together with Stefan Gall, worked on a plan intended to give the square a degree of autonomy from the buildings around it by means of a 'light line' between two fountains. The square had to accommodate a major expansion of the Van Gogh Museum and the construction of a half-underground car park on the southwest side. This made it necessary to raise the level of the square on that side. Andersson made a virtue out of this necessity by trying to evoke a sense of the archetypal Dutch horizon (and to allude to a Rembrandt etching). Van Eesteren's motorway was eliminated. The entrance to the car park took the form of a 'dog-ear', a sloped corner of the lawn that was especially large because the private investor would only agree to the plan if the



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6.19 Carel Weeber, design for Museumplein, 1989. a: luxury houses, b: hotel, c: extension of Stedelijk Museum, d: luxury apartments, e: extension of Van Gogh Museum, f: residential complex

6.20 Aerial photograph of Museumplein as designed by Sven-Ingvar Andersson and Stefan Gall.

entrance also gave access to an underground supermarket.[16] On 19 August 1999, Freek de Jonge opened the renovated Museumplein with a brief stand-up comedy act.

Meanwhile, the renovation of the Rijksmuseum had begun. Hans Ruijssenaars proposed an underground storage area on the side facing the square. He also wanted to close the passage to through traffic and turn it into the grand entrance that Cuypers had envisaged. The studio of Cruz y Ortiz, later chosen as the lead architects for the renovation, presented a similar concept, projecting the main entrance into the heart of the passageway. This left room for an adjacent bicycle path. Another aspect of the assignment was developing a concept for the gardens. Besides reorganizing and tidying up the gardens themselves, this also involved forging a connection between the Rijksmuseum and Andersson's new plan. As the lead architects, Cruz y Ortiz had final responsibility for the design of the gardens, but they were assisted by a garden and landscape architect. In 2004 the Utrecht firm of Copijn Tuin- en Landschapsarchitecten was chosen for this role. Although their

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6.21-22 Artist's impressions of the museum garden, designed by Copijn Tuin- en Landschapsarchitecten, 2011.

6.23-24 Impressions of the completed museum garden, 2013.

design met the functional terms of reference – it preserved the open-air museum atmosphere, distinguished between different sections of the garden, called for low-maintenance native plants, and required no more than two gardeners – it was also very conservative and so architectural in character that the contrast with the building was anything but pronounced (**6.21, 6.22**).

While the discussions of the garden took place in relative calm, the passageway became a hotly debated issue. In Andersson's Preliminary Design from 2002, the passageway remained open to foot and cycle traffic. The same was true of the Cruz y Ortiz plan, at least on the face of it. But by placing the entrance in the middle of the passageway, they raised questions of traffic safety.[17] For this reason the Rijksgebouwendienst (Government Buildings Agency) and the Rijksmuseum all wanted to eliminate the bicycle path through the passage. There was a public outcry, and the district council came out in support of leaving the passage open to cycle traffic. The councillors based their opinion on the recommendations of the Amsterdam advisory council for city planning, which had argued that 'the connection . . . [is] present on many people's "mental map" and . . . widely appreciated'.[18] In the years that followed, the district council remained insistent that the passageway had to remain open; on 29 January 2004, it unanimously adopted a motion urging that this be guaranteed for the future.[19]

The passageway once again became the subject of a study. Urban planning expert Maurits de Hoog (of the Amsterdam planning department) concluded that by the standards set out in the Recommendations for City Traffic Facilities, the passage clearly offered too little space to accommodate everyone's wishes. The directors of the museum renovation project suggested that the objective of turning Museumplein into 'a leading cultural attraction on a European scale', with 4 to 6 million visitors a year, was at odds with the wish to leave the passageway open.[20] Nevertheless, the museum decided to accept the position that through traffic should remain possible.[21] The Amsterdam Cyclists' Union, a 'Committee to Save the Passage', and the district council continued their efforts to keep the passageway open, but their opponents also made their voices heard. Architects Tjeerd Dijkstra, Ben Loerakker, Fred Rocco, Jaap van Rijs and Noud de Vreeze sent a joint press release to Chief Government Architect Mels Crouwel in May 2005.

The Policy Document on Basic Principles released in 2005 put an end to the debate: the passageway was to stay open, the side lanes would be for pedestrians only, and the central lane would remain open to cyclists. It seemed that Ruijssenaar's grand entrance in the centre of the building would never be more than a dream. 'Well, this is how things go in the Netherlands; this is what comes of public participation,' Crouwel opined.[22] Yet the sorely missed central entrance hall did ultimately take shape – not in the centre of the passage, but on either side, in the indoor courtyards. This solution appears to have combined the best of both worlds, shifting the attention back to Museumplein.

The Final Act?

In 2010, Copijn Tuin- en Landschapsarchitecten was invited to submit the Final Design for the gardens. From this point on, Cruz y Ortiz were no longer involved. The background to this change of plans was the arrival of a new museum director, Wim Pijbes, in 2008. Pijbes felt that the Cruz y Ortiz plan was not ambitious enough. If the garden was to become the museum's calling card, then the design would have to give it a distinct identity. Ideally, it would have to attract visitors throughout the year and offer enough flexibility for a varied programme of activities.

Cuypers' garden sketch from 1901 was still taken as a point of departure, as it had been for the original plan, but was now freely interpreted.[23] The 'period rooms' were adapted to serve as settings for changing architectural elements, such as Amsterdam playground equipment designed in the 1950s by architect Aldo van Eyck. The garden and building came to form a *Gesamtkunstwerk* that incorporated the additions and alterations of recent decades and placed more emphasis than earlier designs on the interplay with the reinvented museum. Moving the service entrance to one side of the garden and eliminating the bicycle shed allowed the designers greater creative freedom. A space was created on the east side of the passage that has become a play area for children. It includes a fountain with jets of water that shoot high into the air in an ever-changing pattern. In the tradition of Dutch gardens, vegetables are grown; this forms a conceptual link to the vegetables in the paintings inside the museum. The plan is to use these vegetables in food in the long run. 'Experience' is a key concept, and plants were selected to create an extended blooming season: there are flowers from early spring to late autumn. Compared to the Cruz y Ortiz plan, the garden looks lush, free-spirited, and unrestrained.

The garden acts as a transition to the square, which is being redesigned again now that the museum has reopened. Just one year after completion, Andersson's design for the square proved to have been undermined by spending cuts at the implementation stage and a laughable maintenance budget. In 2007, the sum of 10 million euros was committed to Museumplein. The following year, four scenarios were developed, ranging from inaction to the transformation of the green lung into a traditional city square. The guiding concept of the *square as field*, intended to respect the basic principles of Andersson's plan but depart radically from many of the details, was adopted in June 2007 and confirmed that December in the Museum Quarter Vision. This new concept involves moving the entrance to the car park, restoring sight lines, and establishing a lorry-free zone. The aim is to create a harmonious, integrated whole on a par with Berlin's Museumsinsel and Vienna's Museumsquartier.[24]

City planner Ton Schaap and landscape architect Michael van Gessel drew up the final version of the design. Sweeping away Andersson's street furniture, they laid out spacious paths and 16-m-wide avenues around the grassy field, and set off the grass with stone borders seven times as broad as ordinary curbs. Their new square is more robust; the walking routes mesh with the pattern of the surrounding streets.[25] The plan looks ahead to the new situation, in which both the Stedelijk Museum and the Van Gogh Museum will have their entrances on the Museumplein side. Instead of a green sea between backs of buildings, the square will be a large, green field like a shared forecourt. The 'dog-ear' will make way for a large pond, which will reflect light onto the overhang of the extension of the Stedelijk Museum. This solution was inspired by an Andersson-designed pond next to the Karlskirche in Vienna. Let us hope that the Schaap and Van Gessel design will close the book on more than a century of struggle over the cultural heart of the Netherlands.

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6.25 The garden to the south side of the Rijksmuseum.

6.26 Playground equipment by Aldo van Eyck in front of the Entrance Building in the museum garden, 2013.

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Climate Control Systems

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F.01 Detail of a design drawing for the museum's heating and ventilation system, 1879.

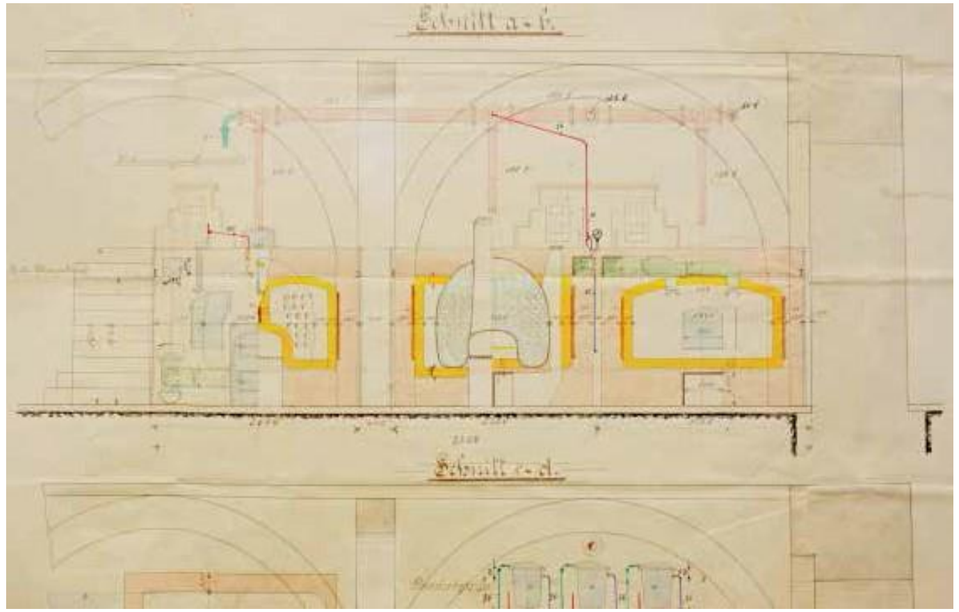
To protect its collection and guarantee the comfort of its many visitors, the Rijksmuseum requires an excellent climate control system. In its early years, the museum had coal-fired heaters in the souterrain. The heated air rose through the thick walls of the building into the exhibition galleries, in a process concealed from visitors. The courtyards were also integrated into this initial air circulation system. Yet it proved incapable of heating all areas of the museum to a uniform temperature, and fresh air was in short supply. During major renovations after the Second World War, the technical systems on the underground level were modernized several times. Coal was replaced by heating oil and later by natural gas. At the same time, the museum extensions, which had taken the place of the courtyards, required a new air circulation system. This time, the air shafts were hidden away behind dividing walls and in the spaces above the false ceilings. When these partitions and false ceilings were removed during the most recent renovation, the systems behind them were revealed.

As part of the plan for the new Rijksmuseum, the climate control system was redesigned. In many respects, the new design harks back to the original concept, in which technical systems were kept out of sight and air ducts were integrated into the walls. This approach was felt to be both historically and aesthetically appropriate. Incorporating the new system into the historic fabric of the building proved to be a complex challenge, and Cruz y Ortiz and Van Hoogevest worked together with consulting building services engineers from Arup and partners. They decided to install two separate air circulation circuits. The air-conditioning units for the souterrain and ground floor were placed in an Energy Ring largely encircling (and partly underneath) the existing building. The centre of this Energy Ring is no longer in the main building but deep below the new Entrance Building; this leaves more space in the souterrain for exhibitions.

The air from the Energy Ring is delivered into the building through steel pipes that pass between the wooden foundation piles. Beneath the raised floor, the air is distributed among the floor grilles in the souterrain and the ducts in the walls, which deliver it to the ground floor. Because the original shafts were not large enough, new, larger air ducts were carved into the walls. The air inlet grids on the ground floor are underneath the windows. On both floors, air passes out of the exhibition galleries into the courtyards through openings in the windows. From there, most of it returns to the underground air treatment units, which heat or cool it as required and circulate it back into the building. The need for fresh air from outdoors is determined on the basis of visitor numbers. When necessary, a few panels in the glass roofs open automatically, admitting fresh air from outside directly into the courtyards.

The air treatment units for the museum galleries on the main floor have been installed in the ridge of the roof. Through openings in the roof slope, fresh air is drawn into the building. Various systems have been built in the ceilings of the galleries below to conduct air in and out, thus regulating the temperature and humidity.

Another important aspect of climate control is insulation. Insulation requirements played a central role in the development of the modern glass used in the museum's new windows, and the options for wall insulation were the subject of thorough research. The aim was to find the best option for conservation of works of art without damaging the building. After long and sometimes heated discussions, the final decision was to cover the interior sides of the outer walls with Calsitherm, a material developed at Dresden University of Technology. Parts of the window recesses were also covered with Calsitherm. This chalky material helps maintain a constant humidity in the exhibition galleries, and despite being porous, it insulates effectively. This is an important characteristic, because non-porous insulation material would have caused damage to features of the historic building such as the tile panels on the outer walls.



F.02

F.02-03 The original coal-fired boilers in the souterrain of the museum, c. 1900.

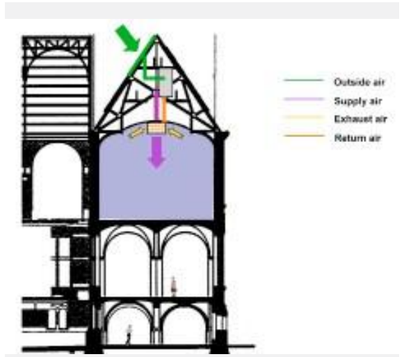
F.03

F.4 The boiler house in 1961.

F.5 Before the museum courtyards were filled in, in the 1960s, ventilation shafts were installed along the walls, since they would no longer be visible anyway.

F.04

F.05

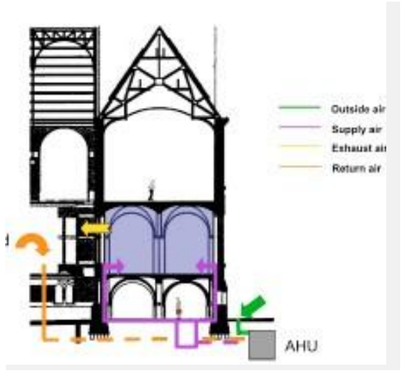


F.06

F.07

The new climate control system designed and incorporated into the building design by Cruz y Ortiz and Van Hoogevest Architecten in collaboration with the building services engineers at Arup and partners.

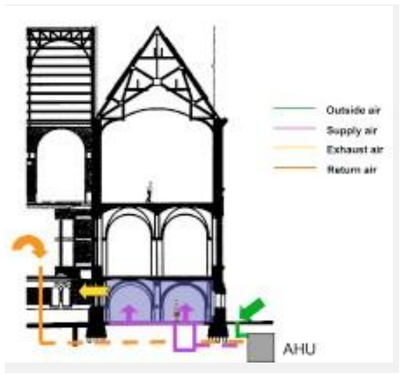
F.06-07: The air circulation system on the main floor, where the air treatment unit has been installed in the ridge of the roof.



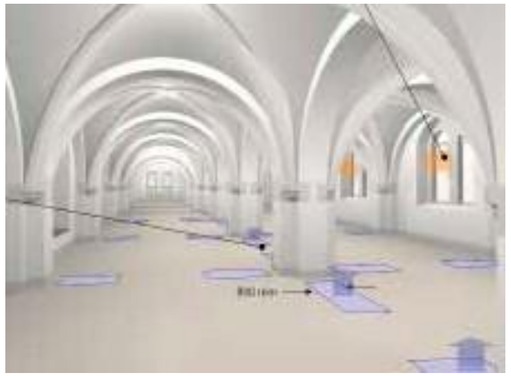
F.08

F.09

F.08-11: The air treatment units for the exhibition areas on the ground floor and in the souterrain are in the Energy Ring, and the air returns there by way of the courtyards.



F.10



F.11

F.12-13 For the new climate control system, larger air ducts were cut into the walls.

F.12

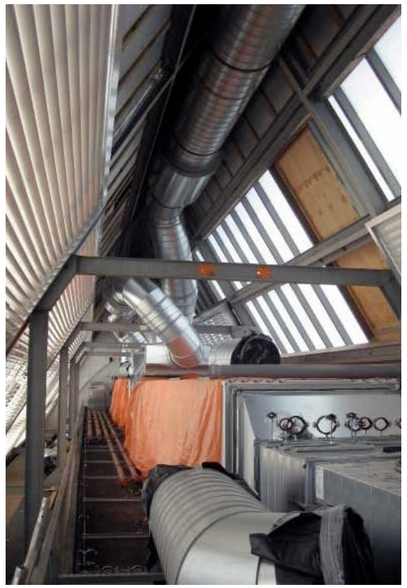
F.13

F.14 Installation of wells/catch pits under the souterrain floors.

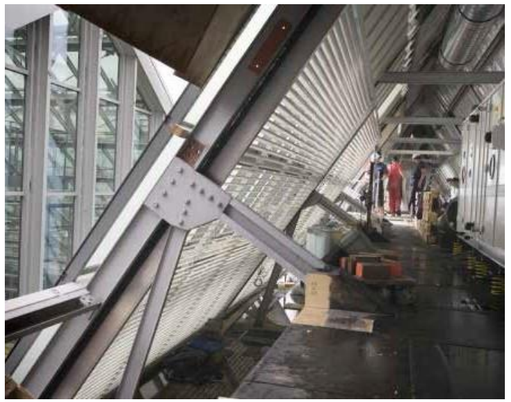
F.14

F.15

F.16-17 Work on climate control systems in the rooftops.



F.16



F.17

F.15 Installation of the climate control system on and under the roof.

F.18 Fire and ventilation hatches in the new glass roof over one of the courtyards.

F.18

F.19

F.20

F.21

F.22

F.19 Construction of conduits between the western section of the Energy Ring and the souterrains of the main building, 2009.

F.20 Duct running beneath the west courtyard.

F.21 The construction of the energy centre beneath the Entrance Building, 2011.

F.22 The northern section of the Energy Ring, 2011.