

GERHARD RICHTER

TWO GRAY DOUBLE MIRRORS FOR A PENDULUM

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INTRODUCTION

Foucault's Pendulum

It was French physicist Léon Foucault who first proved without relying on astrological observations – through experiments with his namesake pendulum in 1851 – that the Earth rotates on its axis. For many years Gerhard Richter harbored a fascination with the Foucault pendulum and experienced a number of active pendulums slowly and rhythmically swinging over the terrestrial surface to reflect the incremental revolution of the planet. His discussions with renowned professors of physics further fueled his interest in this astounding physical phenomenon as it deepened his knowledge. The German artist's visit to one of the most famous Foucault pendulums, at the Panthéon in Paris, marked a key moment of inspiration, and finding a location where he could construct his own interpretation of the device became a longtime pursuit. Kasper König, former director of the Ludwig Museum in Cologne, was aware of the artist's obsession with the pendulum. A native of Münster, he is also founding director of the internationally acclaimed *Skulptur Projekte Münster*, a citywide exhibition that has taken place every ten years since 1977. In late spring 2016 König met with the director of the Kunsthalle to discuss Richter's desire to create an interpretation of the pendulum. From the art center's windows there is a great view of the decommissioned Gasometer, which he suggested as a potential site for the installation.

The Location

Shortly thereafter Richter was invited to Münster to see the Gasometer. It quickly became clear that it was not a suitable location, and the eighteenth-century Dominikanerkirche (Dominican Church) was suggested as an option. Upon entering the building Richter was immediately inspired by its monumental dimensions and spiritual atmosphere, proposing it as the ideal location for his Foucault pendulum. The church, constructed between 1705 and 1725, was designed by architect Lambert Friedrich Corfey as part of a larger cloister complex for the Dominican order. Its elegant appearance and majestic proportions reflect the Roman-French influences in the architect's baroque-style architecture. In 1811 the cloister was secularized. During the Second World War the building suffered massive damage and was reconstructed by 1974.

The Process

When Richter visited the Dominikanerkirche in July 2016, it housed an altar located centrally in the transept under the dome, a large organ over the west entrance, and a baroque altar in the nave. By then the church had been consecrated again and was owned by the city of Münster. First the structural feasibility of installing a pendulum in the dome had to be determined, and then the municipality had to ratify a political resolution accepting the adaptation of the church as a cultural center to host events complementing the permanent art installation. All of these hurdles were surmounted in an astoundingly rapid sequence.

On October 18, 2016, the Münster city council voted unanimously for the realization of Richter's *Two Gray Double Mirrors for a Pendulum* in the Dominican Church. The Westfälische Wilhelms-Universität (WWU) of Münster offered scientific expertise for construction of the pendulum, and financing for the project was secured largely through private and state funding. A profanation of the church took place in fall 2017, followed by preparation for installation of the artwork, a gift from the artist to the city. Over the next couple of years the church will be completely renovated for adaptation as a public refuge and cultural forum for inner-city residents of Münster.

The Installation

During fall 2016 Richter began to consider how to incorporate the Foucault pendulum in the context of an art installation, and *Two Gray Double Mirrors for a Pendulum* started to take shape. The artist's highly diverse oeuvre encompasses both conceptual and perceptual considerations and spans a wide range of artistic methods and mediums, often defying clear standards of definition. Richter is best known for his paintings, ranging in style from photorealistic to purely abstract, but his extensive body of work also includes photography, sculptural and archival installation, and performance. It is not the first work he has realized for a religious structure: Richter's multicolor glass *Kölner Domfenster* ("Cologne Cathedral Window") was inaugurated in 2007.

The art installation *Two Gray Double Mirrors for a Pendulum* (Work Nr. 953) consists of three components:

- a Foucault pendulum, a scientific instrument constructed according to Gerhard Richter's stipulations, magnetically driven by a specially produced magnetic microprocessor, with a non-magnetic metal ball (Ø 22 cm, 48 kg) hung from a 28,75 meter-long non-twistable steel chain (3 mm) in the center of the dome. The metal chain is threaded through a Charron Ring visible in the upper realm of the dome. The ring (ca. Ø 7 cm) prohibits an elliptical movement of the pendulum which would otherwise transpire due to the earth's rotation.
- a circular stone plate designed by the artist under which the pendulum moves (ca. Ø 400/560 cm). Its diameter is equivalent to the distance of the swinging motion of the pendulum. The concave form of the disk affords it a sculptural quality. It is constructed out of "Grauwacke" a 380 million year old sedimentary stone formation. The inner circular section is gray brown due to an impregnation, the outer ring is untreated showing a light gray coloration. A scale of 360° is engraved in the surface of the plate which is divided further into twelve segments. The 0° of the scale points to the west of the church's nave.
- Four vertical glass panels (each 600 × 134 × 1 cm) showing unnuanced gray enameled backsides. Two panels are of an identical darker gray tone and two panels in grays one slightly lighter than the other. The fronts are vaporized with a mirroring coating. In the transept and directly across from each other, the panels are hung in pairs with a distance of 4 cm and mounted slightly tilted 14–15 cm from the wall on invisible hangers bestowing them with a floating quality.

The Double Mirrors

For the artwork in the Dominican Church, Richter decided to incorporate panes of glass, a material he has used often since the late 1960s. In *4 Panes of Glass* (1967), a seminal work that revealed Richter's ideas about the insufficiency of human visual perception, the transparent panels relinquish any attempt at representation, simply framing the transient reality on either side. In 1971 the artist described similar transparent glass works as "metaphors of despair, prompted by the dilemma that our sense of sight causes us to apprehend things, but at the same time restricts and partly precludes our apprehension of reality"¹. In later pieces, starting with *Grauer Spiegel* ("Gray Mirror"), 1977, the back of the glass is coated with pigmented enamel and the front has a reflective surface. Other examples are *Acht Grau* ("Eight Gray"), 2002, held in the Guggenheim Collection and one of the biggest works employing mirrored glass, and the colored-glass installation *Schwarz, Rot, Gold* ("Black, Gold, Red"), 1999, created for the Reichstag, in Berlin.

In Richter's installation for Münster, four large glass panels are coated in uniform gray hues, among which only three different tones can be detected: two of the surfaces are an identical color while the other two are different lighter shades of gray. These are hung in pairs on the walls of the church's transept and crowned by the dome. The panels reflect the visitor moving around the domed area as well as the pendulum and anything else within view. The visitor's mirrored image is constantly in flux, a factor of his or her moving gaze and the constantly changing activity in the space. The viewer continually recreates his or her likeness in the glass surfaces, none embodying a singular definitive visualization or indisputable lasting impression.

Art historian Robert Storr has described how Richter's mirror works play with self-perception through a "tautological twist in the sense that the subject of the image is a reflection of the subject who looks, and that subject is in a position to recompose the picture by moving or by shifting the focus of his or her eyes"². Indeed the fleeting reflection on the glass panels evokes our infinitesimal significance in the endless variables of time and space, prompting a search for the truth behind what we perceive. In this sense the mirrored panels place the viewer in a situation not unlike that of Richter when he relentlessly questions the veracity of the images he produces while clearly acknowledging their potential to generate meaningful discourse. The artist continually recomposes and tests one style or method of artistic inquiry against another, and no one image is deemed capable of representing or replacing an ultimately elusive reality. Similarly Richter's work reminds us of the contradiction inherent to using images as visual and conceptual ruminations of a reality that ultimately escapes any definitive visualization. As an artistic study of self-criticism, Richter's entire oeuvre is a tribute to the continual questioning of the relationship between illusion and reality, subject and object, representation and truth.

Richter's interest in testing methods of visualization acts as a conceptual link between the use of mirrored surfaces in his art and his fascination with the scientific possibilities of an instrument like Foucault's pendulum. Together the mirrors and the pendulum act as an instrument enabling the visualization of something that otherwise cannot be seen with the human eye. The mirrored surfaces allow us only to perceive our immediate selves; the pendulum reveals that the Earth is slowly turning on its axis with our feet firmly placed on its surface in a movement we can neither see nor feel.

1 Robert Storr, *Gerhard Richter: Doubt and Belief in Painting* (New York: Museum of Modern Art, 2003), 86. (Idem Notes 1971 *ibid* 64)

2 Storr, *Gerhard Richter*, 86.

The Color Gray

Gray is a color Richter has used in numerous works, as a pigment on both canvas and glass, since the late 1960s. The gray surfaces of the four panels in the Dominican Church permeate the space with an unsettling emptiness. Gray “makes no statement whatever; it evokes neither feelings nor associations: it is really neither visible nor invisible,” Richter has said. “It has the capacity that no other color has, to make ‘nothing’ visible”³. With the selection of pristine flat surfaces of mirroring gray, Richter has almost completely deleted his own subjective presence as an artist while questioning the idea that art should express an artist’s emotional condition, a notion he spurns. Mute as an avenue of emotional expression, the gray surfaces are devoid of associational potential apart from an uncanny haze of uncertainty. The gray mirrors create a diffuse image drained of vivid detail that vacillates in intensity with the changing refraction of light on their surfaces. The viewer must continually question what he or she sees, as if peering into a darkened void.

In his work Richter constantly challenges how we define what we see, often presenting divergent and even contradictory perspectives. In the case of the gray mirrors, the artist has strategically mounted the four panels very slightly away from the surface of the wall to give the impression of liminal bodies pressing out into space, imbuing them with a nascent sculptural quality. The panels reflect the three-dimensional architectural quality of the church while manifesting their properties as autonomous entities embodied in a row of monochrome gray objects of art. The panel installation visually oscillates between its perception as artwork and as architectural element, leaving the viewer with a feeling of uncertainty.

A Scale for the Pendulum

A large concave stone disk, its diameter equal to that of the pendulum’s trajectory, is mounted beneath the device. The center is a darker shade than the outer rim, which indicates a scale of 360 degrees divided into twelve segments. By following the pendulum as it passes over the scale, the visitor can “read” the movement of the Earth in a slow and mesmerizing visual passage. The swinging of the pendulum is perpetuated by magnetic impulses produced by an instrument designed by the WWU’s Institute of Applied Physics implanted in the floor.

Placed within the dome of the church, Richter’s installation creates an ambience of visual reduction that demands acute and profound concentration. Perspective is shifted in diverse directions as the eye rises up into the dome along the pendulum’s wire, skirting the area beneath its subtle movement and through the mirrored panels to focus on reflections of visitors resonating with the historical narrative of the architectural environment. The attentive viewer is caught up in a sensory circulation provoked by the seen and unseen, known and speculative, crystalline and ambiguous. Here the passage of time seems to be put on hold, allowing for an amplified sense of one’s physical presence that triggers a visceral journey of critical self-reflection.

Dr. Gail Kirkpatrick

³ Storr, *Gerhard Richter*, 62. (Idem Letter to Edy de Wilder 25 Feb. 1975 ibid 82–83)

THE DOMINICAN CHURCH HISTORY AND BUILDING

If visitors to Münster's town centre ask passers-by about the Dominican Church, until now it could safely be assumed that many of those asked would shake their heads and respond: "I've lived for many years in Münster, but to be honest you're asking too much." The reason is that this architecturally important building almost hides behind its brickwork camouflage within the heart of the town. In certain ways it forms the centre of an urban block, surrounded by the library building, the police station and the pedestrian zone.

The Dominican Church has been heritage-protected since 1988 and is the property of the City of Münster. The building was constructed from 1708 to 1725 according to designs of the architect Lambert Friedrich Corfey as part of a cloister complex, and the architecture is judged to be an outstanding example of the Baroque Roman-French High Style. The west facade and well-proportioned interior structure are exceptional, and in architectural terms these features are equal to the Italian and French ideals of the time. The western wall has a so-called "indirect triplicate superposition" with an art-historically complex superimposition consisting of the portal with Doric columns and the double-storey wall arrangement with Ionic and Corinthian pilasters. The interior features a triple-naved, groined vault basilica with central dome and superimposed lantern accompanied by slender, transept-like side sections. As the church of a mendicant order, the architectural elements are characterised by a noticeable simplicity and are almost devoid of ornaments. As a consequence the spatial composition with its outstanding proportional harmony appears all the more impressive.

The Dominican cloister was dissolved during the wave of secularisation in 1811. In state ownership, the church building then served as a militia equipment depot from 1826 for the imperial military treasury. The City of Münster purchased the church in 1881 and used it as a school church for the public secondary school from 1889 onwards. The architecture was provisionally repaired following extensive war destruction in 1944. In 1959 the state of North Rhine-Westphalia constructed a public authority building on the former cloister grounds in the Alter Steinweg that was planned to connect up to the sandstone gable of the cloister, and because a planned road opening was not carried out at this location, in the end only the south facade of the convent building remained as a ruin. The church was then reconstructed in the period of 1961 to 1974. The altar, compliant to liturgical reform, was relocated to the centre of the church below the cross vault. The choir section was separated from the nave by a newly erected wall as a sacrament chapel for the high altar dating from 1699 that was acquired from the Paderborn district church in 1903. Since the 1960s the university community used the church up until its renewed profanation on 12.11. 2017.

The deconsecrated high altar is the only remaining religious work of art in the church, and the coloured carving by the Paderborn artist Heinrich Grone is today deemed to be the last

preserved Westphalian Baroque altar of this quality and size in the Münsterland region. The richly structured architectural backdrop of the altar is enlivened by a complex of imagery consisting of two paintings and four supportive wooden sculptures. The paintings depict the Trinity and the Ascension of the Mary into Heaven. Even though the main painting of the Ascension can be identified as a non-reversed reproduction of the copperplate image by Schelte à Bolswert based on a design by Peter Paul Rubens at Buckingham Palace in London, the originator of both paintings is unknown. Worthy of mention are surprising parallels between the colour designs that could not have originated from the copperplate and the altar image of the eminent Paderborn painter Anton Joseph Stratmann created 50 years later. The four monochromatic sculptures were presumably carved by the sculptor Georg Philipp Brüll, the brother of the altar donor and high clerical dignitary Bernhard Jodokus Brüll (1655–1733). Both larger-than-life figures in the lower zone of the shrine depict two holy bishops: Saint Ulrich on the left, and on the right Saint Liborius, the patron saint of the town and of the Archbishopric of Paderborn. Both locations on the main cornice to the side of the upper altar section are occupied by life-size statues of the Holy Apostles Peter (left) and Paul (right). Three-dimensional numerals below the upper altar painting indicate the year of creation of the altar as 1699.

Almost of equal age, the altar and church are however not related to each other iconographically or stylistically, especially because the pictorial agenda would have been unusual for Dominican orders. The church and altar also significantly differ in terms of their perception and impact: whilst the liturgical furniture illusionistically towers up in front of visitors to the church in monumental, transcendent and yet earth-bound splendour, the architecture surrounds this with the discreet elegance of its balanced spatial arrangement and with a self-assured sense of peace that invites to contemplation.

Seen in total, the Dominican Church diversely brings together such juxtapositions that exist adjacently, but simultaneously appear to be incompatible. On the one hand this is the chequered history of the building with its various functions and ownership situations – a multifaceted spectrum that weaves past, contemporary and future times. And on the other it is the architecture itself that places the longitudinal axis of a sacred building into a fascinating relationship with the profane idea of the central space – both a physically tangible and imaginary balancing act that impacts in a calming, moving and stimulating way.

Perhaps indeed it was this phenomenon of "differential movements" that sparked Gerhard Richter's interest in the Dominican Church and moved him to not only install a pendulum here, but also to place this within the correlation of a new work of art. In a certain way this is an antagonistic principle from which something new may be created without either the one or the other losing its inner logic or legitimacy – veritably an alliance of incompatibilities.

FOUCAULT'S PENDULUM HISTORY AND FUNCTION

An experiment of historical importance

Western culture long presumed that the Earth was a motionless sphere positioned at the center of the universe. An early attempt to conceive of the Sun as the central resting body – with the Earth revolving around it – came about in ancient Greece, when Aristarchus realized that the Sun must be many times larger than the Earth. However, this approach was rejected in light of other concepts of the time that contradicted the notion of the Earth making any sort of motion.

Copernicus summoned Aristarchus's theory and succeeded in replacing the increasingly complex model positing planetary movements around the Earth with a relatively concise model placing the Sun as the central body. The heliocentric Copernican model of the world gained increasing verification through the scientific experiments of Galileo Galilei, Johannes Kepler, and Isaac Newton. Heated debate concerning the applicability of the geocentric versus the heliocentric planetary system dominated Western culture over many centuries. The issue was ultimately resolved thanks to Foucault's simple experiment verifying that the correct representation of day and night requires the Earth's rotation around the Sun.

How does Foucault's pendulum work?

The Foucault pendulum consists of a ball suspended by a wire that enables it to swing freely around a spherical surface and forces it to oscillate accurately along a particular course. The idea is to observe how it rotates over the duration of its movement according to the force of gravity. The laws of classical mechanics dictate that it will stay constant with regard to the space represented by the starry sky. But if the sphere below the pendulum rotates – as the Earth does – we see the plane of oscillation rotate with respect to the ground on which we stand. It is this movement that verifies the rotation of Earth.

In which direction does the plane of oscillation rotate?

The rotational direction of the oscillating ball is identical to the daily path of the Sun across the sky. Both movements are instigated by the rotation of the Earth; while the Earth rotates in an easterly direction toward the rising Sun, we see the Sun traveling in the opposite direction, from east to west. For those of us in the northern hemisphere, the Sun appears to wander above the horizon via the south from east to west; from the viewpoint of the southern hemisphere, the Sun travels from east to west via the north. That means that at the North Pole the pendulum would oscillate to the right, yet an Antipodean would observe it turning to the left.

What is the speed of this rotation?

Let's imagine that we have such a pendulum swinging at the North Pole. Clearly the Earth rotates below it within a period of 24 hours; the same pendulum at the South Pole would rotate during the same period in the opposite direction. But where exactly does the rotational sense switch? The change in direction is not dramatic but rather in continuous transition: the rotation of the plane of oscillation becomes slower and slower as we approach the equator, where the Foucault pendulum finally has no rotation at all.

Because we are situated at a location somewhere between the pole and the equator, the full rotation of the pendulum takes longer than 24 hours. Here in Münster it takes around 30 hours, a fact that can be verified mathematically. We do not sense the Earth's rotation because it is relatively slow and its angular speed cannot be seen directly, just as in our town the Foucault's pendulum requires a period of 30 hours to make its full revolution, so that patience is needed to witness this phenomenon.

The rotation of the oscillation plane is very slow.

We usually do not notice the earth's rotation because it is decidedly too slow to perceive. This becomes clear if we compare it to the progress of the hour hand on the face of a watch. Its angular speed cannot be seen directly. Be aware that the rotational speed of the earth is just half of this. Indeed in our town of Münster the angular speed of the Foucault pendulum takes 30 hours instead of 24 hours to rotate one time completely which makes it even slower by a factor of 25%. This means that patience is needed – we have to take time to witness the change in movement under the pendulum.

Foucault's experiment

The world of physics had progressed sufficiently by 1850 to be able to describe forces within rotating systems. As a consequence the concept came about that a cannonball fired in a southerly direction could be deflected to the right due to the rotation on the Earth. It became clear, however, that the effect was too minimal for dependable experimental verification. It was in this context in 1851 that Foucault publicly demonstrated that the Earth's rotation could be proved by the rotation of the pendulum to a large crowd in the Panthéon in Paris.

A contemporary drawing of Foucault's experiment shows the brilliantly simple method with which he visualized the progress of the oscillating plane: he attached a needle to the ball that skimmed away a thin layer from a small "wall of sand" with each swing of the pendulum. The flaw of this simple mechanism is that its amplitude decreases over time due to frictional losses until it eventually comes to a complete rest. Because of this the local pendulum is equipped with an electromagnetic drive.

Instead of a needle, a rod-shaped magnet is fixed to the ball, which is propelled by a magnetic coil installed in the center of the floor, enabling the pendulum to oscillate consistently.

Foucault's experiment brought a polemical issue that Western civilization had struggled with for many centuries to a peaceful and generally accepted solution. As a result this artwork represents a sense of global peace and reconciliation, and the strokes of its pendulum bid us to take notice of the world's pulse.

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