



A Free Course on the History of Western Art

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- Welcome. This is one of over 200 talks on the history of Western Art. I have arranged the talks chronologically starting with cave art through to art produced in the last few years.

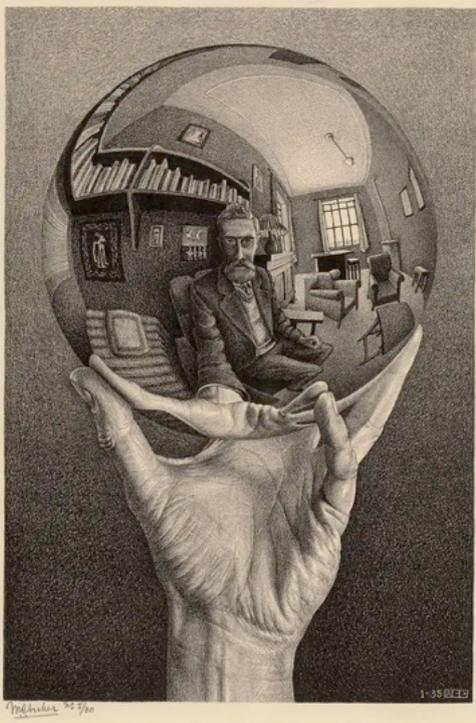
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54-01 MAURITS ESCHER

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Maurits Escher (1898-1972)

**Hand with
Reflecting Sphere**
1935

- This is Section 54, a section specifically devoted to Maurits Escher as he was a unique type of artist.

BIOGRAPHY

- Maurits Cornelis Escher (1898–1972) was born in Leeuwarden, Netherlands, he showed early artistic promise despite being considered a poor student. Trained as a graphic artist in Haarlem, he spent formative years travelling Italy, where the landscapes and architecture captivated him. A 1936 visit to the Alhambra in Granada proved transformative, igniting his lifelong obsession with tessellation and mathematical symmetry. His mature work — impossible architectures, infinite loops, metamorphosing creatures — made him one of the twentieth century's most recognisable printmakers.
- **1898–1922.** He was born on 17 June 1898 in Leeuwarden, the youngest son of a civil engineer. A mediocre pupil, he showed talent only in drawing. On the advice of his graphic arts teacher, Samuel Jessurun de Mesquita, he enrolled at the School for Architecture and Decorative Arts in Haarlem, where he trained as a printmaker rather than an architect.
- **1922–1935.** Escher settled in Rome, making extended sketching tours through southern Italy and Corsica. The dramatic landscapes, hilltop towns, and intricate Moorish tilework he encountered fed an ever-growing fascination with pattern, depth, and spatial illusion. He married Jetta Umiker in 1924 and the couple raised three sons in Rome.
- **1936–1941.** A second visit to the Alhambra in Granada, studied meticulously

with Jetta, was the decisive turning point. Escher began developing his own system of tessellations — interlocking birds, fish, and reptiles — applying rigorous geometric principles to artistic ends. He corresponded with mathematicians including the crystallographer Friedrich Haag and later George Pólya.

- **1941–1972.** Returning to the Netherlands during the Second World War, Escher produced the celebrated works for which he is best known: Metamorphosis, Drawing Hands, Relativity, and Ascending and Descending. Despite little formal mathematical training, his visual explorations of infinity, the Möbius strip, and hyperbolic geometry earned the admiration of mathematicians worldwide. He died in Laren on 27 March 1972.

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<https://mcescher.com/>

Slide 1: Hand with Reflecting Sphere (1935)

- Source: <https://www.nga.gov/artworks/47949-hand-reflecting-sphere>
- Alternative: <https://www.wikiart.org/en/m-c-escher/hand-with-reflecting-sphere>

Slide 2: Metamorphosis I (1937)

- Source: <https://www.wikiart.org/en/m-c-escher/metamorphosis-i-1937>

Slide 3: Day and Night (1938)

- Source: <https://www.nga.gov/collection/art-object-page.46633.html>

Slide 4: Sky and Water I (1938)

- Source: <https://www.nga.gov/collection/art-object-page.34385.html>

Slide 5: Metamorphosis II (1939-1940)

- Source: <https://www.gemeentemuseum.nl>

Slide 6: Reptiles (1943)

- Source: <https://escherinhetpaleis.nl/en/about-escher/masterpieces/reptiles>

- Alternative: <https://www.tate.org.uk/art/artworks/escher-reptiles-p04783>

Slide 7: Encounter (1944)

- Source: <https://www.wikiart.org/en/m-c-escher/encounter-1944>

Slide 8: Three Spheres II (1946)

- Source: <https://www.nga.gov/collection/art-object-page.34388.html>

Slide 9: Drawing Hands (1948)

- Source: <https://www.nga.gov/collection/art-object-page.34390.html>

- Alternative: <https://www.tate.org.uk/art/artworks/escher-drawing-hands-p07355>

Slide 10: Relativity (1953)

- Source: <https://www.nga.gov/collection/art-object-page.46637.html>

- Alternative: <https://mcescher.com/gallery/impossible-constructions/>

Slide 11: Print Gallery (1956)

- Source: <https://escherinhetpaleis.nl/en/about-escher/masterpieces/print-gallery>

Slide 12: Belvedere (1958)

- Source: <https://www.gemeentemuseum.nl/en/exhibitions/escher>

Slide 13: Circle Limit III (1959)

- Source: <https://www.nga.gov/collection/art-object-page.34391.html>

Slide 14: Ascending and Descending (1960)

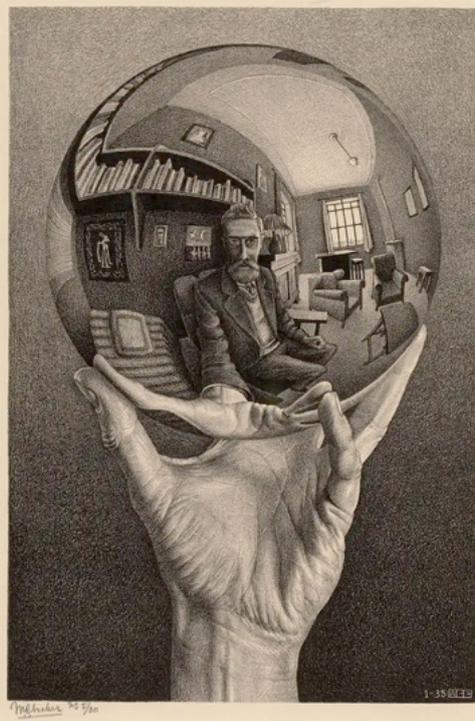
- Source: <https://www.wikiart.org/en/m-c-escher/ascending-and-descending-1960>

Slide 15: Waterfall (1961)

- Source: <https://escherinhetpaleis.nl/en/about-escher/masterpieces/waterfall>



Fara San Martino, Abruzzi, May 1928, woodcut



Maurits Escher (1898-1972)

Hand with Reflecting Sphere

1935

Lithograph

31.8 × 21.3 cm

National Gallery of Art,
Washington D.C.

Maurits Escher (1898-1972), *Hand with Reflecting Sphere*, 1935, Lithograph, 31.8 × 21.3 cm, National Gallery of Art, Washington D.C.

Fara San Martino, Abruzzi, May 1928, woodcut

- M.C. Escher (1898–1972) was born in Leeuwarden, Netherlands, the youngest son of a civil engineer, and while his family encouraged his creative side, he initially **struggled academically**. He **failed his high school exams** and briefly enrolled in the Haarlem School of Architecture and Decorative Arts. However, his mentor, Samuel Jessurun de Mesquita, recognized his talent for woodcuts and persuaded him to switch from architecture to graphic arts.
- He was quiet, methodical and disciplined. Despite the surreal nature of his art, he was **reserved, introspective, and possessed a "mathematical" precision** that often left him feeling more like a scientist than an artist.
- After completing his school, he travels for a long time through Italy. He met Jetta Umiker and they married in 1924 and went to Rome, where they live until 1935. During these 11 years M.C. Escher travels every year through Italy where he makes drawings and sketches that he later uses in his studio for his lithographs, woodcuts and wood engravings.
- (CLICK) This is an example of one of his landscapes from that period. (CLICK)
- Escher created this during **personal upheaval. Fascism was rising in Italy**. His financial situation
- This self-portrait shows Escher gazing at himself through a mirrored sphere held in his right hand. The convex reflection captures his entire studio at 122 Via

Alessandro Poerio in Rome. The sphere distorts space dramatically. Objects close to the viewer appear enlarged whilst distant elements shrink away. Escher sits dead centre, staring directly outward. Few knew Escher used actual mirrored Christmas tree ornaments as models. He owned several different sizes. His head occupies the exact midpoint between his eyes. The lithograph reverses the image, so his right hand appears as his left. Indonesian shadow puppets hang on the wall behind him. This was made during his Italian period, just before political turmoil forced him to leave Rome.

- remained precarious. He sold few prints. The sphere could symbolise his attempt to understand his position in a disintegrating world. He decided to leave Italy in 1935 travelling to Switzerland for two years, then Brussels and then the Netherlands. His focus shifted inward inspired by the Moorish tiles of the Alhambra, he became obsessed with tessellations (regular divisions of the plane) and "impossible objects."
- In 1936, Escher travelled returned to Spain, revisiting the Alhambra and spending days at a time making detailed drawings of its mosaic patterns. It was here that he became fascinated, to the point of obsession, with tessellation, explaining:
 - **It remains an extremely absorbing activity, a real mania to which I have become addicted, and from which I sometimes find it hard to tear myself away.**

NOTES

- During his lifetime, Escher made 448 lithographs, woodcuts and wood engravings and more than 2000 drawings and sketches. Just like some of his famous predecessors – Michelangelo, Leonardo da Vinci, Dürer and Holbein – Escher was left-handed.
- Forerunners of Escher include Parmigianino's *Self-portrait in a Convex Mirror*, 1524, William Hogarth's *Satire on False Perspective*, 1753 and Piranesi's *Carceri Plate VII – The Drawbridge*, 1745, reworked 1761.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

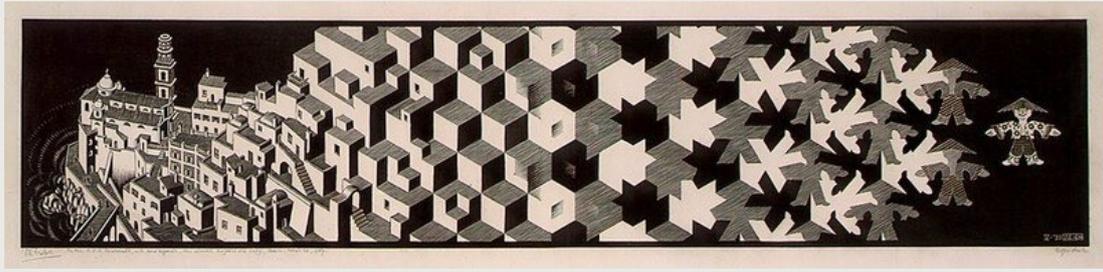
Via Alessandro Poerio: VEE-ah ah-less-AHN-dro po-EH-ree-o

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Maurits Escher (1898-1972), *Metamorphosis I*, 1937,
Woodcut, 19.5 × 90.8 cm, Private collection

Maurits Escher (1898-1972), *Metamorphosis I*, 1937, Woodcut, 19.5 × 90.8 cm, Private collection

- This elongated woodcut marks Escher's **first major exploration of transformation**. An **Italian coastal town** gradually **morphs** into geometric patterns, then into a **stylised Chinese figure**. The transitions occur so smoothly that viewers cannot pinpoint exact moments of change. Each form contains seeds of what comes next. The horizontal format forces the eye to travel slowly across the surface, experiencing transformation as a temporal journey rather than instant revelation.
- Contemporary critics **struggled with it**. Traditional art reviewers **dismissed it as decorative craft** rather than fine art. Mathematician George Pólya, however, recognised its mathematical sophistication, calling it "a visual proof of continuous transformation."
- Escher made this after **fleeing Italy for Switzerland in 1937**. **Mussolini's regime had become unbearable**. The move devastated him emotionally. He left behind the Mediterranean light he loved. *Metamorphosis* reflected his psychological state—one identity dissolving into another. Switzerland felt alien and cold. He desperately missed Italian landscapes.
- The print took **three months to carve**. Escher cut the woodblock so thin it warped slightly during printing. He destroyed several early impressions.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

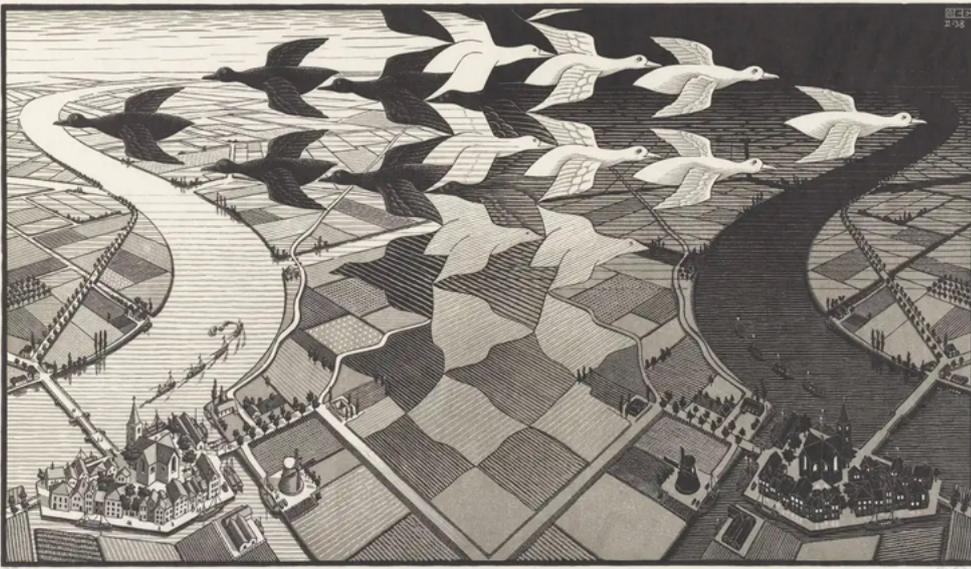
Metamorphosis: met-ah-MOR-foh-sis

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Maurits Escher
(1898-1972)
Day and Night
1938
Woodcut
39.1 × 67.7 cm
National Gallery of Art,
Washington D.C.

Maurits Escher (1898-1972), *Day and Night*, 1938, Woodcut, 39.1 × 67.7 cm, National Gallery of Art, Washington D.C.

- Black and white geese emerge from a **Dutch polder landscape**, flying in opposite directions across day and night skies. The birds function as both positive and negative space simultaneously. **Black geese** fly left into daylight. **White geese fly right into darkness.** Below them, fields form a tessellated pattern that generates the birds above. The landscape mirrors itself inversely on each side. This duality—light and dark, day and night, positive and negative—creates perfect symmetry whilst maintaining perpetual opposition.
- Art critic M.C. Richards wrote that Escher had achieved "**the impossible reconciliation of opposites**," a visual paradox that remained logically coherent.
- Escher created this whilst living in **Ukkel, Belgium**, after leaving Switzerland. He felt increasingly isolated. **War loomed across Europe.** The division between day and night reflected broader divisions tearing the continent apart. Escher visited Dutch polders specifically to sketch the geometric field patterns. The flat Dutch landscape, divided into perfect rectangles, provided ideal source material for tessellation.
- Escher carved the woodblock in mirror image. He printed white areas first, then black, requiring perfect registration. A single misalignment would ruin the print.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

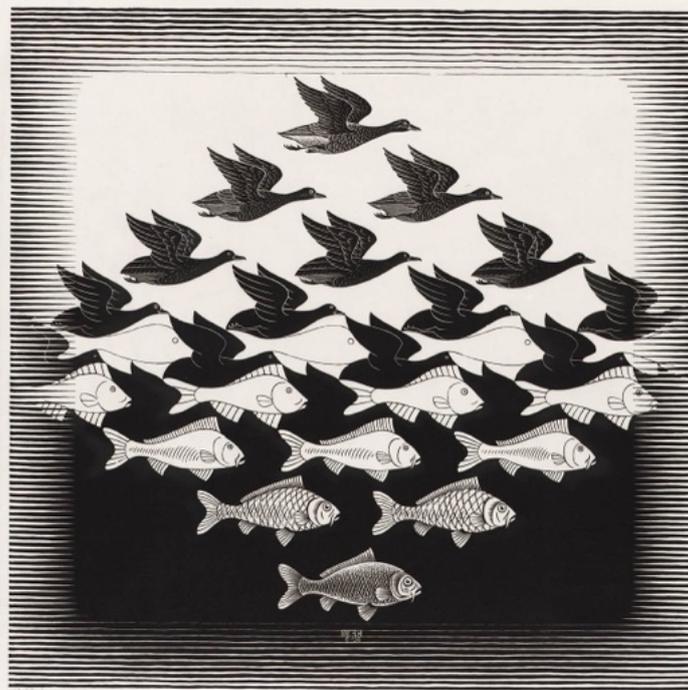
Ukkel: OO-keel

Polder: POLE-der

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<https://mcescher.com/gallery/symmetry/>



Maurits Escher
(1898-1972)
Sky and Water I
1938
Woodcut
43.5 × 43.9 cm
National Gallery of Art,
Washington D.C.

Maurits Escher (1898-1972), *Sky and Water I*, 1938, Woodcut, 43.5 × 43.9 cm, National Gallery of Art, Washington D.C.

- **Birds transition seamlessly into fish** through brilliant tessellation. At the top, clearly defined black birds fly against white sky. Moving downward, birds dissolve into background whilst fish emerge from negative space. At the bottom, white fish swim against black water. The centre line becomes ambiguous—neither bird nor fish dominates. Each form depends entirely on its opposite for definition. Remove one element and the entire composition collapses. This interdependence between figure and ground represents one of Escher's most elegant solutions to spatial division.
- Mathematician Roger Penrose later commented that Escher had "**visually demonstrated the principle of duality**" more effectively than any mathematical diagram could achieve.
- Escher made this during his **Belgian exile**. Europe was sliding toward war. He felt trapped between two worlds—his beloved Mediterranean past and an uncertain Northern European future. The transformation between birds and fish mirrored his own sense of being **neither one thing nor another**. He sketched the initial design on tracing paper, working through dozens of iterations before achieving perfect interlocking.
- The woodblock for this print still exists in the Escher Museum collection. Close examination reveals his carving errors, carefully corrected.

PRONUNCIATION GUIDE

Maurits: MOW-rits

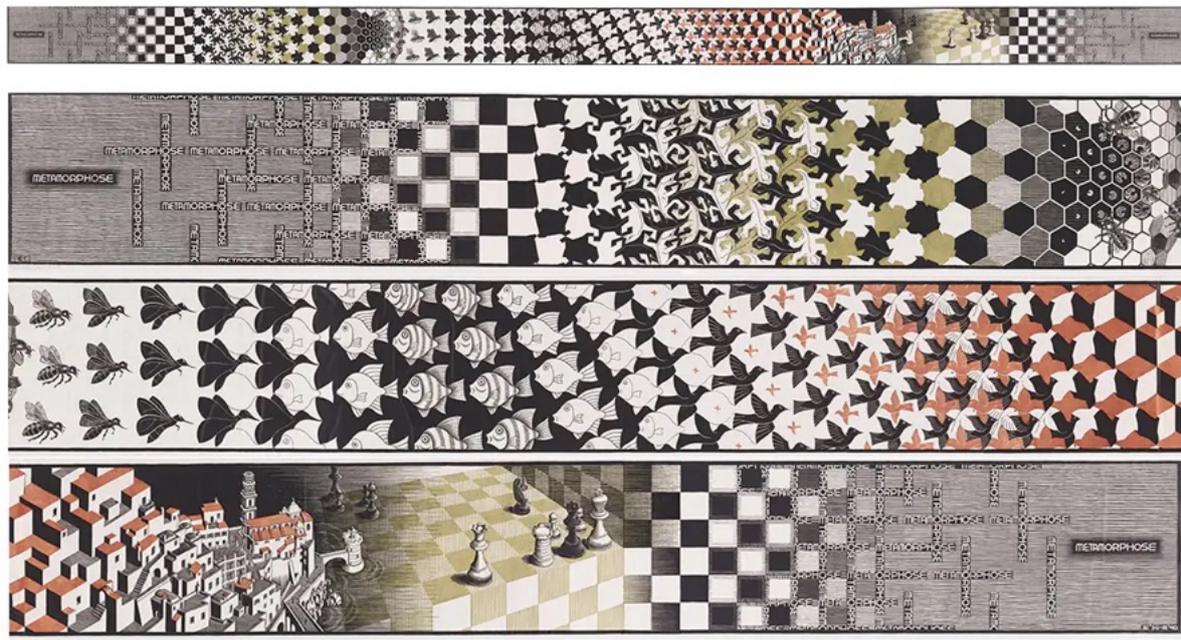
Escher: ESH-er

Tessellation: tess-ell-AY-shun

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Maurits Escher(1898-1972), *Metamorphosis II*, 1939-1940, Woodcut, 19.5 × 389.5 cm, Gemeentemuseum,Den Haag

Maurits Escher (1898-1972), *Metamorphosis II*, 1939-1940, Woodcut, 19.5 × 389.5 cm, Gemeentemuseum, Den Haag

- This monumental work stretches **nearly four metres long**. The top panel shows the complete work which is expanded beneath into three sections so you can see the transformations more clearly.
- The word "METAMORPHOSE" transforms through countless iterations: letters become geometric patterns, patterns become lizards, lizards become hexagons, hexagons become bees, bees become birds, birds become fish, fish become chess pieces, pieces become buildings, and buildings return to the word itself. The cycle completes perfectly. Each transformation occurs gradually enough to follow yet quickly enough to maintain momentum. Twenty distinct phases merge into continuous flow. This represents Escher's most ambitious single project—a visual symphony of perpetual change.
- Art historian Bruno Ernst described it as "**the Sistine Chapel ceiling of tessellation**," an artwork of unprecedented scope and ambition in graphic arts.
- **Escher began this in 1939 as Nazi Germany invaded Poland**. The world was transforming catastrophically. He worked obsessively through 1940 as war engulfed Europe. The endless metamorphosis perhaps reflected the relentless changes destroying the world he knew. **He lived in occupied Holland, increasingly isolated**, continuing to work whilst everything collapsed around him. Creating order through tessellation became psychological survival.
- Escher printed this across twenty separate woodblocks. Aligning them required

extraordinary precision. Most editions show slight misregistration between sections.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Gemeentemuseum: kheh-MAIN-tuh-mew-ZAY-um

Den Haag: den HAKH

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Maurits Escher
(1898-1972)
Reptiles
1943
Lithograph
33.4 × 38.5 cm
Escher Museum,
The Hague

Maurits Escher (1898-1972), *Reptiles*, 1943, Lithograph, 33.4 × 38.5 cm, Escher Museum, The Hague

- **Small lizards climb out** from a flat tessellated pattern on a sketchbook page. They become three-dimensional creatures, scramble up books and objects, reach the summit of a dodecahedron, then descend back into flatness. The cycle perpetuates itself. Two-dimensional transforms into three-dimensional and back again. Reality and representation interchange continuously. The lizards appear momentarily alive during their brief journey through three dimensions before returning to pure pattern. This meditation on dimensionality and artistic creation shows Escher's fascination with boundaries between real and imagined.
- Philosopher Douglas Hofstadter later called this "**a perfect visual metaphor for the strange loop**"—a system that refers back to itself through hierarchical levels.
- Escher created this during Nazi occupation of Holland. Food was scarce. Movement restricted. Creating art became his primary act of resistance. The cycling lizards perhaps represented his own psychological escape—briefly emerging from the flat constraints of occupation before being forced back. His actual studio was chaotic during this period, cluttered with objects he used as props.
- **The dodecahedron shown was a real object Escher owned.** He kept it on his desk for decades. After his death, his son donated it to the Escher Museum.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Dodecahedron: doh-deck-ah-HEE-dron

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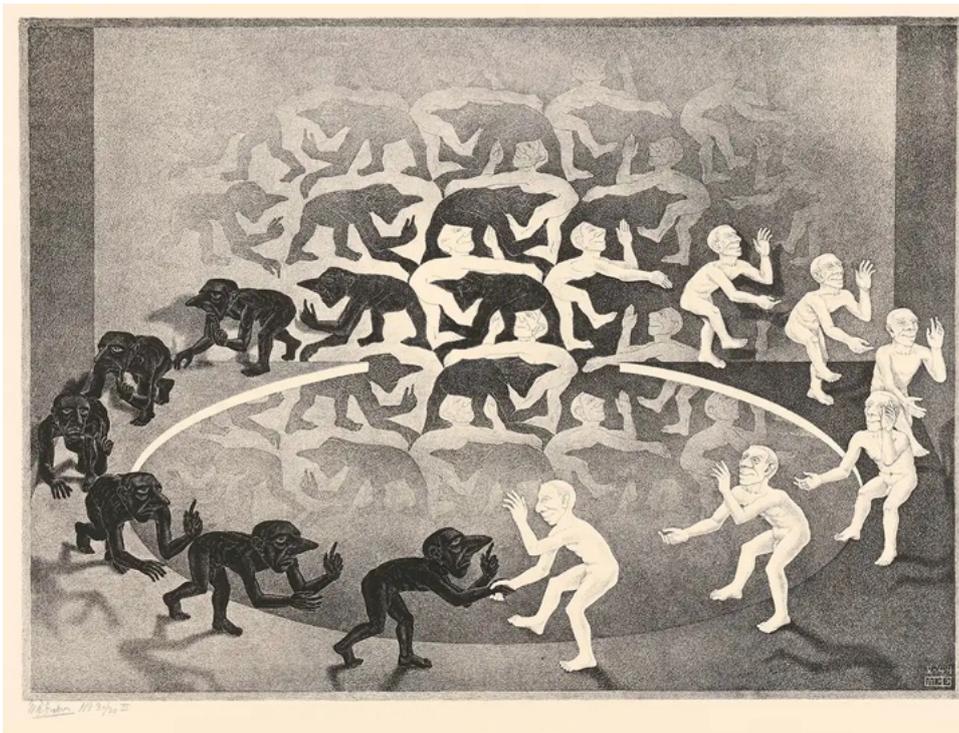
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Maurits Escher
(1898-1972)
Encounter
1944
Lithograph
34.1 × 46.3 cm
Private collection

Maurits Escher (1898-1972), *Encounter*, 1944, Lithograph, 34.1 × 46.3 cm, Private collection

- **Optimistic white figures and pessimistic black figures** emerge from a tessellated background, meeting at the centre in a handshake. The figures represent opposing states of mind—joy and despair, hope and cynicism. They remain locked in eternal greeting yet frozen in fundamental opposition. The **background pattern generates both types** simultaneously, suggesting that optimism and pessimism spring from the same source. The circular composition reinforces the sense of perpetual cycle. Neither viewpoint can exist without its opposite. The handshake represents not resolution but acknowledgement of duality.
- Art critic Gillo Dorfles noted Escher captured "**the fundamental human condition—permanently divided yet seeking connection.**"
- Created during the **Hongerwinter—the Dutch famine of 1944-1945. Thousands starved.** Escher himself suffered from malnutrition. The encounter between black and white figures took on desperate meaning. Would humanity emerge from this catastrophe better or worse? The ambiguity reflected his uncertainty. He traded artworks for food. His family survived on tulip bulbs and sugar beets. Yet he continued working.
- Escher initially titled this "White and Black." He changed the title only after the war ended, perhaps hoping encounter might lead to reconciliation.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

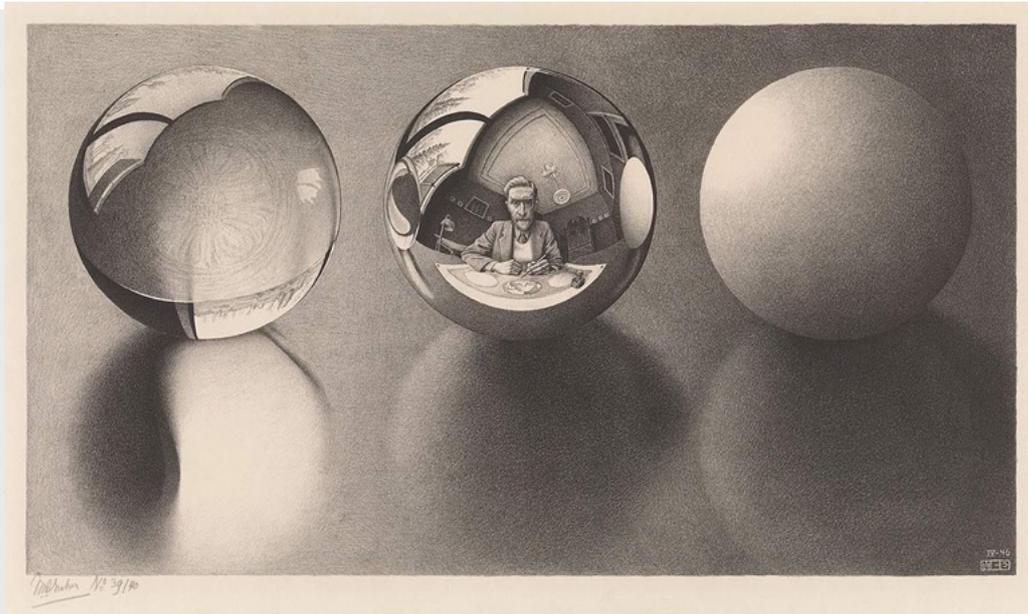
Hongerwinter: HONG-er-vin-ter

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Maurits Escher (1898-1972),

Three Spheres II

1946, Lithograph, 26.2 × 46.5 cm, National Gallery of Art, Washington D.C.

Maurits Escher (1898-1972), *Three Spheres II*, 1946, Lithograph, 26.2 × 46.5 cm, National Gallery of Art, Washington D.C.

- Three spheres rest on **different surfaces**, each demonstrating distinct material properties through masterful rendering. The left sphere appears **transparent like glass or crystal**. The centre sphere shows **mirror-like reflective metal**, capturing the surrounding room and other spheres in its convex surface. The right sphere **displays matte stone or plaster**, absorbing rather than reflecting light. This technical tour de force showcases Escher's supreme command of lithographic technique. Each sphere required completely different mark-making approaches. The work celebrates pure representational skill whilst simultaneously questioning the nature of perception itself.
- Printmaker Stanley William Hayter proclaimed it "**technically flawless—a demonstration that lithography could rival oil painting for subtlety.**"
- Escher made this **immediately after liberation in 1946**. Holland was devastated. **Cities lay in ruins**. The art market had collapsed entirely. Nobody wanted to buy prints of spheres. But Escher felt compelled to prove his skills remained sharp after years of deprivation and isolation. He spent weeks perfecting the reflections. This became his statement that artistic excellence could survive catastrophe. **Post-war critics largely ignored it**. Recognition came only decades later.
- Escher used three different lithographic stones for this print—one for each sphere. He printed them separately, then combined the images on a single

sheet. Few other printmakers attempted such complexity.

PRONUNCIATION GUIDE

Maurits: MOW-rits

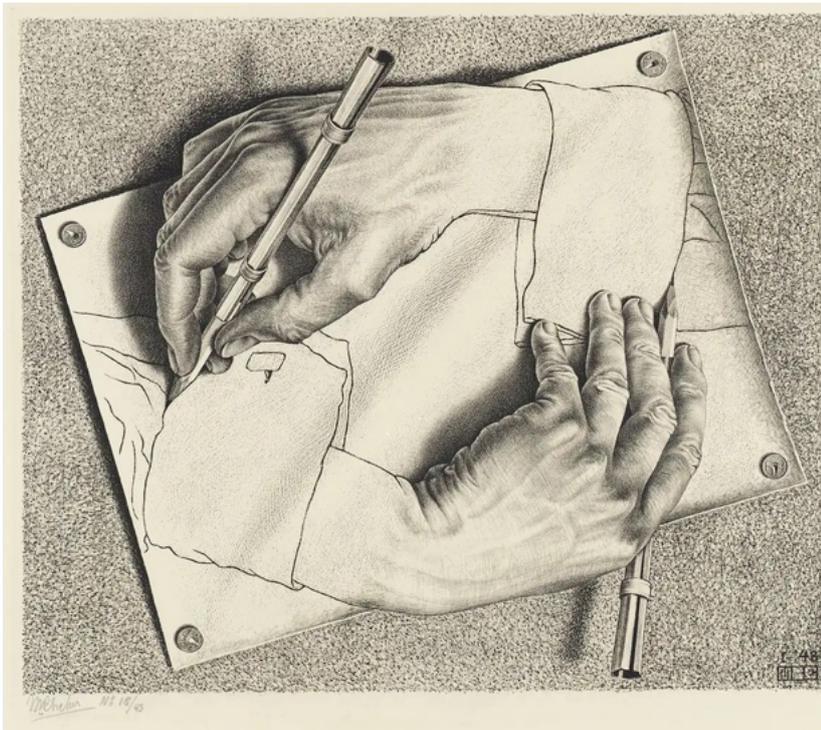
Escher: ESH-er

Lithograph: LITH-oh-graf

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Maurits Escher
(1898-1972)

Drawing Hands

1948

Lithograph

33.2 × 28.2 cm

National Gallery of Art,
Washington D.C.

Maurits Escher (1898-1972), Drawing Hands, 1948, Lithograph, 33.2 × 28.2 cm, National Gallery of Art, Washington D.C.

- Two hands draw each other into existence simultaneously. The right hand sketches the left hand's cuff. The left hand sketches the right hand's cuff. Both emerge from a flat paper surface, becoming three-dimensional before our eyes. Neither hand can exist without the other. Remove one and both vanish. This paradox of mutual creation represents **Escher's most famous recursive loop**. The image questions fundamental assumptions about causality and origin. **What comes first? Neither and both.** The flat paper remains flat; only the drawn elements achieve dimensionality. Reality and representation blur completely.
- Cognitive scientist **Douglas Hofstadter** devoted an **entire chapter to this image** in "**Gödel, Escher, Bach,**" calling it "**the quintessential visual representation of self-reference and strange loops.**"
- Escher created this whilst struggling with artistic recognition. **Gallery owners still dismissed his work** as mere illustration. He felt trapped in a recursive loop himself—needing recognition to gain recognition. The hands drawing each other mirrored his frustration. Yet he persisted. By 1948 his technical mastery was absolute, even if commercial success remained elusive. He used his own hands as models, drawing them repeatedly.
- The original lithographic stone for this print developed a crack in 1962. Escher could produce no more editions. Existing prints became instantly more

valuable.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Recursive: ree-KUR-siv

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Maurits Escher (1898-1972), *Relativity*, 1953, Lithograph, 29.5 × 29.2 cm, National Gallery of Art, Washington D.C.

An image from the film *Labyrinth* starring David Bowie (pronounced "BOH-ee")

- **Seven staircases occupy three different gravitational planes** simultaneously. Figures walk up and down stairs that appear horizontal or vertical depending on perspective. What is floor for one figure becomes wall for another. **Sixteen figures inhabit this impossible architecture**, each obeying their own gravitational laws. They coexist in the same space whilst experiencing completely different realities. The architecture appears logical from each individual viewpoint yet becomes paradoxical when seen as a whole. This visualises Einstein's theories about relative frames of reference whilst creating pure visual poetry.
- Mathematician **Roger Penrose** wrote that Escher had "**intuited principles of general relativity through pure visual imagination, achieving what equations could only describe.**"
- Escher created this at age fifty-five, entering **his most productive period. International recognition was finally arriving.** *Time* magazine featured him in 1954. Scientists and mathematicians embraced his work enthusiastically, even as traditional art critics remained dismissive. He corresponded extensively with **mathematicians about tessellation** and topology. This print synthesised years of architectural studies. He based the staircases partly on medieval Italian buildings he had sketched decades earlier.

- (CLICK) The film "Labyrinth" starring David Bowie (pronounced "BOH-ee") used this image extensively. Jim Henson's production designers built three-dimensional sets attempting to recreate its impossible geometry. They partially succeeded using camera tricks and forced perspective.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Topology: top-OL-oh-jee

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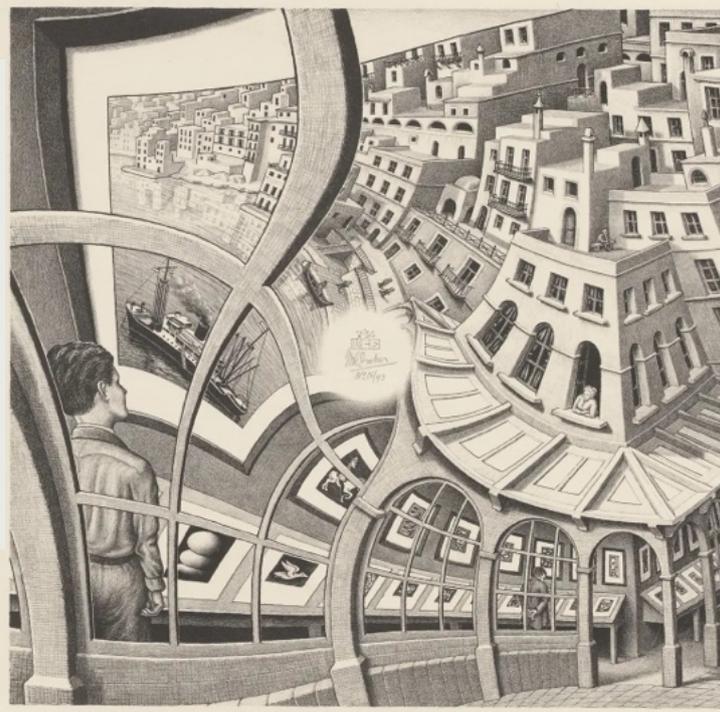
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Maurits Escher
(1898-1972)
Print Gallery
1956
Lithograph
31.9 × 31.8 cm
Escher Museum,
The Hague

Maurits Escher (1898-1972), Print Gallery, 1956, Lithograph, 31.9 × 31.8 cm,
Escher Museum, The Hague

Droste Effect

- A young man views a print in a gallery. The print depicts a harbour town. Following the architecture around, the town contains the gallery where the man stands viewing the print. The recursive loop spirals inward toward a mysterious blank centre that Escher could never resolve mathematically. The distortion increases approaching the centre. Buildings stretch and warp. The man views himself viewing himself infinitely. In 2003, mathematicians finally filled the blank centre digitally, revealing it required impossible logarithmic expansion. Escher intuitively understood the problem but lacked the mathematical tools to complete it.
- (CLICK) Mathematician Hendrik Lenstra stated Escher had "**accidentally constructed a Droste effect decades before we properly understood the mathematics underlying such transformations.**" The Droste effect is named after a cocoa powder advertisement where the nurse is holding a tray with a cocoa box with the same image and so on ad infinitum.(CLICK)
- Escher spent months attempting to solve the centre. He filled sketchbooks with failed attempts. Eventually he admitted defeat and left it blank, claiming his signature filled the void. This became his most intellectually ambitious work. Recognition was growing steadily. **Museums began acquiring his prints.** He corresponded with crystallographers and mathematicians worldwide. His Italian

architectural studies from the 1920s finally found purpose in these impossible constructions.

- In 2003, a team at Leiden University used advanced algorithms to complete the centre, publishing their solution in "Notices of the American Mathematical Society." The completed version revealed Escher had been tantalizingly close.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Leiden: LY-den

Droste: DROS-tuh

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Maurits Escher
(1898-1972)

Belvedere

1958

Lithograph

46.2 × 29.5 cm

Gemeentemuseum,

Den Haag

Maurits Escher (1898-1972), *Belvedere*, 1958, Lithograph, 46.2 × 29.5 cm, Gemeentemuseum, Den Haag

- An impossible architectural structure where **columns connect wrong levels**. The second floor sits perpendicular to the first yet appears continuous. Pillars run outside on the lower level but inside on the upper level. A seated figure holds an impossible cube—the key to understanding the building's paradox. The crossbar of the cube connects impossibly, existing in two planes simultaneously. **Eight figures populate the structure**, seemingly unaware of the impossibility surrounding them. Mountains recede behind. A ladder leans against the building. Everything appears rational locally but becomes irrational globally.
- Architect Jan Dietz wrote that Escher had created "**the most famous unbuilt building in history—more influential than many actual structures.**"
- **Escher was sixty** when he made this, at the **peak of his powers**. He received **invitations to lecture worldwide**. Scientists treated him as an equal. **Traditional art critics still sneered**, but he no longer cared. His health remained robust. **He worked daily in his studio**, producing increasingly complex impossibilities. The Italian Renaissance architecture he had drawn decades earlier merged with topological insights from his mathematical correspondents. He based the impossible cube on work by Swedish crystallographer Oscar Reutersvärd.
- Several architects have attempted to build physical versions using forced perspective and clever camera angles. A partial version exists in Wuppertal,

Germany, visible only from specific viewpoints.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Belvedere: bell-veh-DEER

Reutersvärd: ROY-ters-vord

Wuppertal: VUP-er-tahl

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Maurits Escher
(1898-1972)

Circle Limit III

1959

Woodcut

41.5 cm diameter

National Gallery of Art,
Washington D.C.

Maurits Escher (1898-1972), Circle Limit III, 1959, Woodcut, 41.5 cm diameter, National Gallery of Art, Washington D.C.

- **Fish swim in curved lines** toward a circular boundary they can never reach. **Four fish meet at each intersection point.** The space follows hyperbolic geometry—**non-Euclidean mathematics** where parallel lines diverge and angles of triangles sum to less than 180 degrees. As fish approach the circle's edge, they shrink infinitely. **The boundary represents infinity itself.** Escher discovered **hyperbolic tessellation** after reading about it in mathematical journals. This transforms abstract mathematics into sublime visual experience. The fish appear to swim through curved spacetime itself, visualising concepts usually confined to equations.
- Mathematician H.S.M. Coxeter called this "**the most beautiful demonstration of hyperbolic geometry ever created,**" later collaborating with Escher on more circle limit variations.
- Escher created this after extensive correspondence with Canadian mathematician H.S.M. Coxeter. Their letters exchanged mathematical concepts and artistic possibilities. Escher was sixty-one, still intellectually voracious despite no formal mathematical training beyond high school. He taught himself hyperbolic geometry through pure visual experimentation. This represented the fusion of his lifelong interests: tessellation, infinity, and transformation. He carved four separate woodblocks for different fish colours, printing them in perfect registration.

- NASA later used this image on a poster promoting space exploration, noting its connection to **Einstein's curved spacetime theories**. Escher was bemused by the appropriation.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Hyperbolic: hy-per-BOL-ik

Coxeter: COX-eh-ter

Euclidean: yoo-CLID-ee-an

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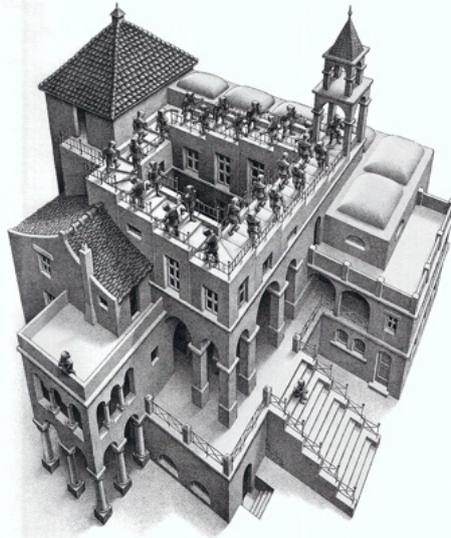
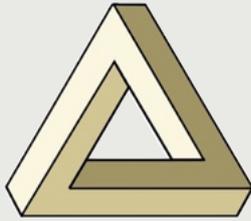
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Maurits Escher
(1898-1972)
Ascending and Descending
1960
Lithograph
38 × 28.5 cm
Private collection

Maurits Escher (1898-1972), *Ascending and Descending*, 1960, Lithograph, 38 × 28.5 cm, Private collection

- Robed figures endlessly circle a staircase atop a building, perpetually ascending or descending without ever getting higher or lower. The architecture employs the Penrose staircase—an impossible object where each step rises but the circuit returns to starting height. One figure climbs clockwise, convinced he ascends. Another descends counterclockwise, equally certain of descent. Both engage in futile eternal labour. Two rebels sit apart, refusing to participate in the meaningless cycle. This visualises Sisyphian futility. The metaphor works multiple ways: religious ritual, social conformity, existential purposelessness, the human condition itself.
- Philosopher Albert Camus might have appreciated this image for his essay "**The Myth of Sisyphus**"—psychologist Oliver Sacks noted it perfectly captured "**the prison of certain neurological conditions**" where patients loop endlessly.
- **Escher was sixty-two**, increasingly philosophical about age and mortality.
- (CLICK) He based the architecture on the **Penrose triangle**, published by British mathematician Roger Penrose in 1958. Reading Penrose's article immediately sparked this composition. Escher completed it quickly, working from rough sketches directly to final lithograph. (CLICK)
- **International fame was overwhelming. Museums worldwide requested exhibitions.** Universities offered honorary degrees. He deflected most attention, preferring studio work to celebrity. Yet he understood this image

resonated beyond art circles.

- **The staircase has been recreated in numerous films and video games.** "Inception" features a digital version. Monument Valley uses it as a core gameplay mechanic.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Penrose: PEN-rose

Sisyphean: sis-ih-FEE-an

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Maurits Escher
(1898-1972)
Waterfall
1961
Lithograph
38 × 30 cm
Escher Museum,
The Hague

Maurits Escher (1898-1972), *Waterfall*, 1961, Lithograph, 38 × 30 cm, Escher Museum, The Hague

- **Water flows downward along an aqueduct**, turns corners, drops over a waterfall, then somehow returns to its starting point to fall again. The stream creates a **perpetual motion machine**—thermodynamically impossible yet visually convincing. Escher constructed this using **three Penrose triangles**, invisible as individual units but creating the impossible circuit. Pillars rest on impossible foundations. Everything appears rational locally. The paradox only emerges from global comprehension. Two improbable polyhedra sit atop the towers—stellated dodecahedrons that Escher grew fond of including as sculptural elements. Vegetation grows impossibly. **This became his most reproduced image.**
- Physicist **Richard Feynman** kept a copy in his office, noting it reminded him that "**intuition can be systematically wrong—we must test everything.**"
- **Escher was sixty-three**, slowing down slightly but still producing masterworks. He had achieved everything denied him earlier—**recognition, financial security, respect from intellectuals**. Yet he remained personally modest, bemused by fame. The waterfall represented culmination of his life's work: impossible architecture, mathematical precision, and technical virtuosity. He worked from detailed architectural drawings, calculating angles meticulously before carving the lithographic stone. His eyesight was declining. This would be among his final major works.

- In 1986, Shigeo Fukuda created a three-dimensional physical version using forced perspective. It works only from one exact viewpoint. From all other angles, the illusion shatters completely.

PRONUNCIATION GUIDE

Maurits: MOW-rits

Escher: ESH-er

Aqueduct: ACK-wih-duct

Polyhedra: pol-ee-HEE-drah

Stellated: STELL-ay-ted

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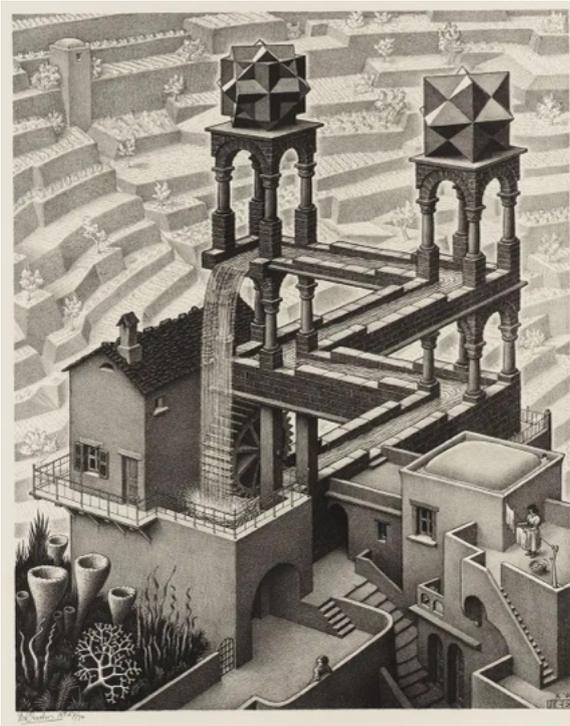
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Maurits Escher
(1898-1972)
Waterfall
1961

- Escher's legacy is unique; he remained an **outlier in the art world**, ignored by critics but **championed by mathematicians** and hippies alike. His work **bridges the gap between art and geometry**, exploring infinity, reflection, and the **paradoxes of perception**. Today, he is a **cultural icon** whose "impossible" visions continue to influence graphic design and cinema.
- Thank you for your time and I hope to be seeing you again soon.



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