Summer 7-23-2023

Charles and Ray Eames

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July 23, 2023

Life and Designs of Charles and Ray Eames

"Only when you get into a problem, and the problem becomes clear, can creativity take over." (Charles Eames, Demetrios -b Ch.3)

Charles and Ray Eames (Demetrios -b Ch. 1 Pg. 11)

Charles and Ray Eames were a dynamic husband-and-wife team and were two of the most influential multidisciplinary designers of the 20th century. Their innovative and human-centered design approach and remarkable creativity resulted in innovative contributions to various fields of design, including architecture, graphic design, industrial design, and film-making. Known for their groundbreaking contributions to design, the Eameses employed a deep understanding of human needs that combined functionality, technology, and aesthetics that still resonate today.

The Eameses' collaborative endeavors began with the invention of molded plywood technology in the early 1940s. Later on, in the spare room of their Westwood Los Angeles apartment, they started work on a device that would eventually be called the "Kazam! machine," named for its sense of magic. (Demetrios Ch. 4). Through this manufacturing technology, they developed the breakthrough technique for molding plywood into complex, three-dimensional shapes.

Using functionality as their work's guiding principle, their design approach combined manufacturability, comfort, aesthetics, and affordability, helping to transform people's perceptions and expectations about furniture in the 20th century. Beyond furniture, the Eameses explored architecture, film, photography, and graphic design, showcasing their commitment to innovation and functionality across various fields. Their interdisciplinary approach allowed them to explore new ideas and experiment with multiple mediums, significantly contributing to each area.

Charles Eames
Early Life Education and Early Career

Charles Ormand Eames Jr. was born in St. Louis on June 17, 1907. The son of Charles Ormand Eames Sr. and Marie Adele Celine Eames (née Lambert). In September 1864, at age fifteen, Charles Sr. became a soldier in the Union Army and volunteered for the Chicago Board of Trade Battery. Charles Sr. became his unit's fife player, positioned next to the drummer boy and near the young man who carried the unit's colors. Charles Sr. saw action as part of Michigan's Fourth Cavalry in May 1865, when they captured Jefferson Davis, the president of the Confederacy. After the Civil War, Charles Sr. worked for the Pinkerton Detective Agency, later becoming the head of security for the Missouri Pacific Railroad as part of the St. Louis Union Station. (Demetrios -a Ch. 5). Charles Jr. later described his family as "super middle-class respectable." (Koenig, Introduction). Charles Sr. married Marie Adele Celine Lambert in 1902, a bride thirty years younger than himself. Celine (as she called herself) had deep local roots, and her forebears arrived in the St. Louis area before the French founded it as a trading post. His mother performed traditional housewife duties, and he had an older sister, Adele. Charles Sr. was frequently exposed to danger. Years later, Charles Jr. would vividly remember the standing rule of "instant obedience."

"If his father said do something, the boy had to do it instantly–no questions asked. Why? Because his father might be telling him to avoid a bullet and there would be no second chances." (Lucia Eames, Demetrios -a Ch. 5).

Charles recalled his father's words, "There may be a case where I can't afford to raise my voice; it might scare the rattlesnake."

Charles Sr.'s work took the family briefly to Brooklyn, New York. In 1912, he brought Charles Jr. to the Port of New York, where his father held him up to see the survivors of the Titanic Tragedy. "This memory stayed with Charles for the rest of his life." (Eero Saarinen, Demetrios -a Ch. 5).

The family returned to St. Louis in time for young Charles Jr. to begin kindergarten. His school used the Froebel method of teaching, which involved blocks in primary and essential shapes as early teaching tools. Frank Lloyd Wright was also raised with this technique as a child. Charles Jr. was curious and an avid reader of labels and instructions, especially patent medicines printed in fifteen to twenty languages. Charles would compare the language to figure each word out. He would look at the Japanese and Italian and compare them to the English ones. (Demetrios -a Ch. 5)

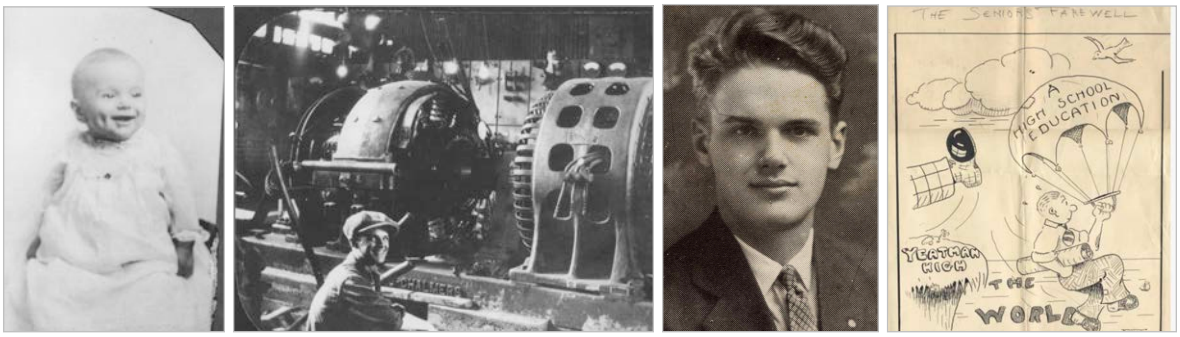
In 1914, Charles Sr. was shot on duty and never fully recovered from his injuries. He had to retire from service and took up writing detective stories. By 1917, Charles Sr.'s health began to decline, and when Charles Jr. was ten, he began to work to support his family, as was the societal expectation at the time. His first job was at Upton Cody's, a downtown St. Louis printing and enveloping shop. His salary was four dollars a week, including Saturdays. "You had damn well get your hands out of the way…I succeeded in keeping all my fingers, which was learning something." (Charles Jr., Demetrios -a Ch. 5). After working for a time at Upton Cody's, Charles Jr. took work at Hyde and Ebler Grocers, and then to a job with the druggist Ernest Niemoller in North St. Louis.

In February 1921, Charles Sr. succumbed to his wounds from the 1914 shootout. This meant Charles Jr. had to contribute more to the family. The $30 per month Civil War pension

wasn't nearly enough to make ends meet. Celine moved the family in with her sisters, and Adele began working with troubled youth. Charles Jr. came across some of his father's belongings, including a trunk of photography materials. Charles Jr. taught himself to use his father's wet plate emulsion photography equipment, a format well-suited to capturing landscapes and architecture. This initiated and influenced a lifelong practice of producing still and moving images, drawing, etching, and painting. (Demetrios -a Ch. 5; EamesInstitute.org).

By the time Charles was fourteen, he was attending Yeatman High School and working at the local Laclede Steel Company as a part-time laborer. (Koenig, Introduction).

At Yeatman High School, Charles became interested in studying drawing, engineering, and architecture crafts. He was a popular student, named captain of the football team, a track star, voted most likely to succeed, and voted president of this senior class. Charles excelled academically, ending his Yeatman education by giving the valedictory speech at graduation. In his 1925 yearbook, he was described as "a man with ideals, courage to stand up for them, and the ability to live up to them." (Koenig, Introduction).



1. *2.* *3.*

1. *Eames Jr., 1908.* ***2.*** *Laclede Steel Mill, ca. 1924 (Demetrios -b Ch. 1 Pg. 14).* ***3.*** *1925, Yeatman High School Sr. Portrait and Yearbook Cartoon (EamesInstitute.com)*

Charles' Education

Charles enrolled at the University of Washington in St. Louis, which he attended he attended on an architectural scholarship. (Koenig, Introduction). He excelled in his first year and was voted President of his first-year class. Although Charles was proficient with his coursework, he found the curriculum constrictive to free thinking. The curriculum was grounded in the conventional philosophy of the Beaux-Arts in classical architecture. At the time, Charles was fascinated with Frank Lloyd Wright and insisted that the faculty modernize its curriculum. On point with how Charles was described in high school, Charles persisted with his view on the importance of modernizing the Architecture Department's education. The University advised Charles to cease this pursuit, and he was ultimately dismissed from the university for being *too modern*. (Demetrios -b Ch. 5).

Left: *Beaux-Arts Classical Architecture: Pennsylvania State Capitol (completed in 1909), designed by architect Joseph Miller Huston (AncestralFindings.com).* ***Right:*** Falling Water *(1935), designed by architect Frank Lloyd Wright (FrankLloydWright.org).*

While at Washington University, he met his first wife, Catherine Dewey Woermann. Catherine obtained her bachelor's degree from Vassar, and she held the distinction of being Washington University's first woman accepted into its architectural program. She was the daughter of Frederick Woermann, a prominent and influential civil engineer who also attended Washington University. On June 7, 1929, Charles and Catherine were married at the Pilgrim Congregational Church in St. Louis.

Amid the Great Depression, Charles understood the best way to find work was to open his own architectural office, partnering with Charles Gray and later Walter Pauley. During the Depression, work was lean at the firm, and they took on almost any project. His notable projects included the commission for the Sweetser House, where he modernized the American Colonial style, giving it white trim. Charles and his firm also were commissioned for a restoration project for the Pilgrim Congregational church, where he and Catherine were married. He replaced the spire, stained glass, and lighting fixtures as part of the restoration. This modernistic approach to architectural design became a signature of Charles Eames.

The Sweetser House: *World War I veteran and Washington University civil engineering professor Ernest Sweetser commissioned this University City home around 1932. He and his wife attended Pilgrim Congregational Church with Eames, who designed the house with his partner Charles M. Gray.*

Unlike the area's prevailing Colonial Revival model, the home is asymmetrical, with just three bays and the front door off-center. The home also has shutters that open and close—unlike faux, non-functional "shutters." (EamesInstitute.com).

The Pilgrim Congregational Church. *In 1929, Charles and Catherine were married at Pilgrim Congregational Church. From 1932 to 1936, Charles was commissioned to design three sets of new oak doors for Pilgrim's narthex, which open onto the auditorium and feature an octagonal pattern and stained glass insets, which Charles produced with the renowned glass maker Emil Frei.****(EamesInstitute.com).***

Charles and Catherine welcomed their only child, Lucia Dewy Eames, in October 1930. Charles took on any work he could get to make ends meet to support his new family. He took assignments in measuring buildings for the Works Progress Administration (WPA) under Franklin Delano Roosevelt.

Charles and Lucia, n.d. (EamesInstitute.com)

Mexico

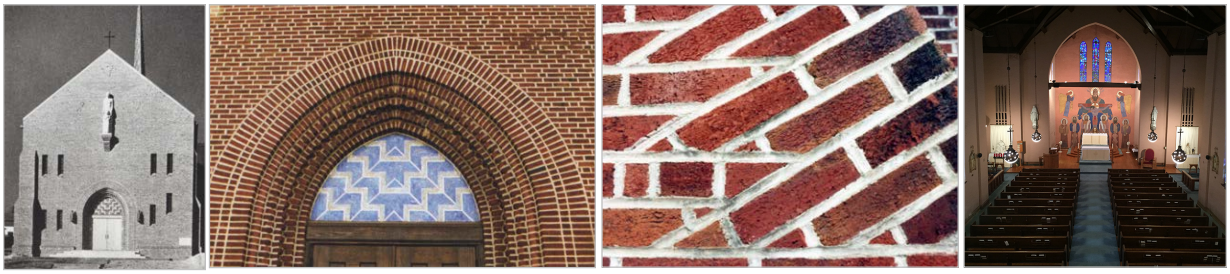
In 1933, Charles left Catherine and Lucia safely with Catherine's parents, and he departed for Mexico with the instinct of the trip, helping him to discover something more to life. He spent eight to ten months in Mexico and the journey was dramatic and served as a reinvention of himself. (Demetrios -a Ch. 7). During his sojourn, Charles immersed himself in the traditions of Mexico, enriching his mind with the visual culture, vibrant colors, and textures. Later in life, Charles frequently alluded to his time in Mexico as transformative. He wandered through the Mexican State of San Luis Potosî and Monterrey City. Charles traded manual labor and his watercolor paintings for food. He painted and watercolored local churches and vistas, later displayed as part of an exhibit at the St. Louis Art Museum.

Watercolors from Mexico: *1933–1934 (Demetrios -b Ch. 1 Pg. 18)*

Many of Charles's experiences during this time underscored the importance of thrift and "how very little one needs to survive." (Koenig, Introduction). The time he spent in Mexico refreshed him, and the lessons learned became the catalyst that sparked his design process, holding him to a high standard of challenging assumptions with the world around him. From there on, Charles didn't believe in hoarding money. Instead, he dutifully invested in doing good work. (Demetrios -a Ch. 7).

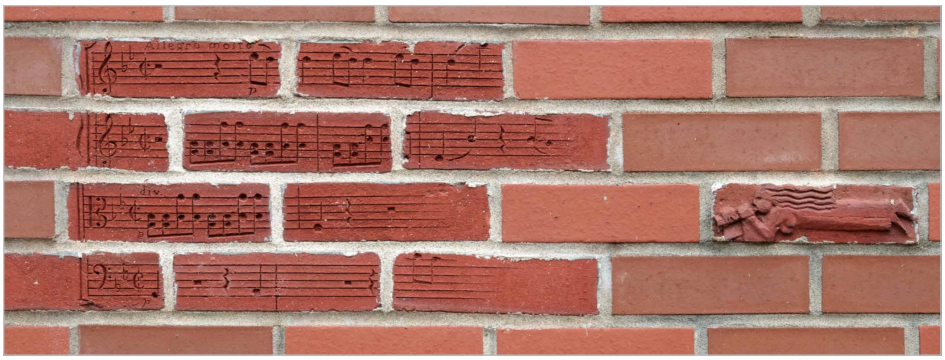
After returning from Mexico, Charles reunited with his family and opened a new architectural firm with an acquaintance, Robert Walsh. Within three years, the partnership designed several homes, the Dinsmoore House, the Dean House, the Meyer House, and the St. Mary's Church in Helena, Arkansas. The St. Mary's church was significant in many ways. The first was that it attracted Alice Meyer (Meyer House) to hire the Eames and Walsh firm for a sizable commission. (Demetrios -a Ch. 7). The second was that it caught the eye of publisher Howard Meyer (no relation to Alice Meyer) of *Architectural Forum.* There it captured the attention of Eliel Saarinen, who later on would encourage him to complete a fellowship at the Cranbrook Academy of Art in Bloomfield Hills, Michigan.

Top: *the Dinsmoore House*
Bottom: *the Dean House (EamesInstitute.org)*

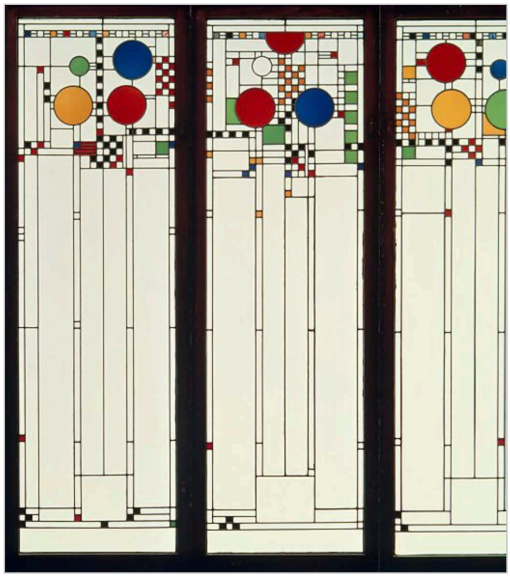


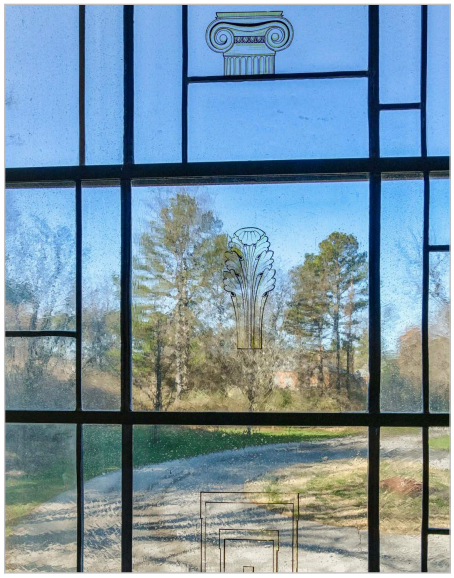
St. Mary's Catholic Church *(EncyclopediaOfArkansas.net and EamesOffice.com)*

The Meyer House, 1936-1938: *Meyer House was built across the road from former Anheuser-Busch CEO August Busch IV's mansion in Huntleigh, Missouri. The best known of Charles's early homes, the Meyer House represents the crossroads in his life, his transition from more traditional craftsmanship to the experimental style he's known for. (EamesInstitute.com).*



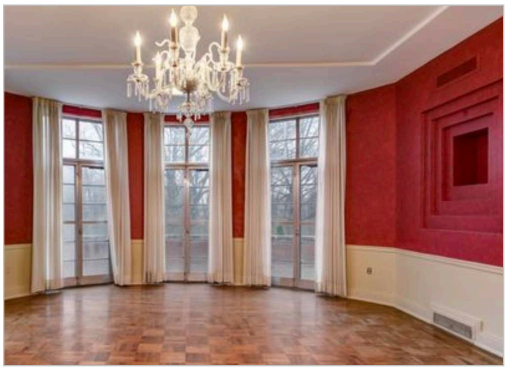
The Meyer House: *Mozart symphony (Number 40 in G Minor), Alice Meyer's favorite song. (EamesInstitute.com, ArchitecturalDigest.com).*





Left: *Avery Coonley estate, in Riverside, Illinois, designed by Frank Lloyd Wright in 1907 was the clerestory containing more than thirty windows, each one slightly different. (MetMuseum.org)*

Right: *The Meyer House staircase stained-glass windows are embellished with Greek elements selected by Eames. Stained glass windows were often a design feature of Frank Lloyd Wright. (FrankLloydWright.org)*



Left: *In the dining room, Eames added striking wall niches, which could be used for display. The room leads to a curved terrace.*

Right: *Eames played with curves in the design of the Meyer house, including "the round library. (ArchitecturalDigest.com)*

Ray Eames
Early Life Education and Early Career

Bearnice Alexandra “Ray” Kaiser was born in Sacramento, California, on December 15, 1912, to Alexander and Edna May Kaiser (née Burr). Because neither of Ray’s parents lived to 60, some details of family lore have not survived the testament of time. (Demetrios -a Ch. 7). Ray had one older brother, Maurice, and an older sister, Elizabeth. Alexander Kaiser was a descendant of the first Jewish settlers of the then-frontier town of Stockton, California. Alexander was involved in theater when he was a teenager, and when he was 22, he toured the West for three years as a “mesmerist,” entertaining people with mind reading. Upon returning to Stockton, he worked at his brother George’s jewelry store as a jeweler, and although Alexander enjoyed the craftsmanship of working with jewelry, his passion for the theater remained. While working as a jeweler, he met Edna May Burr, a relative of U.S. Vice President Aaron Burr. In 1903 Alexander founded his first theater with a few partners, building the Stockton Novelty Theater. It was true to the vaudeville format, “I give ‘em high-class junk and they eat it up!” (Alexander Kaiser, Demetrios -a Ch. 4). Ray would go on to make films. Alexander’s influence and love for vaudeville and film could have had a foundational impact.

Alexander (33) and Edna (19) were married in October 1906, and they set up a house in Stockton, where Maurice was born. After a lousy investment in potatoes in 1909, the family lost nearly everything, and the three moved to San Francisco, where Alexander managed two theaters. Shortly after, Elizabeth was born in 1910, when Alexander was asked to move to Sacramento to manage the Grand Theater. Bearnice Alexandra “Ray” Kaiser was born in 1912, and

Maurice gave her the nickname “Ray-Ray,” which she changed legally to Ray in 1954. Around this time, Elizabeth died suddenly at the age of two. (Demetrios -a Ch. 6). Ray’s upbringing was described as warm and protective due, likely due to the sudden and tragic death of her sister. (Koenig, Introduction).

“My parents, I think, were absolutely extraordinary, the more I realize it; I never knew it at the I believe, a time. But the sense of quality, the sense of enjoyment, everything which I recognized in Charles. As a child was there in my parents without their doing anything about it. It was just there. The quality of very good enjoyment, of games and toys and all the things.” (Ray Eames, Demetrios -b Ch. 1).

Alexander Kaiser loved being in nature and outdoors. He particularly enjoyed fishing and would take trips with vaudevillian Al Jolson. Alexander would take his family out in the country when they were very small. Sunday meant to *go,* and time in nature was considered more valuable than Sunday School. Ray described this time with her father as an “extraordinary quality of engagement.” (Demetrios -a Ch. 1). Ray spent time panning for gold with her Uncle George, and the nuggets she found became life-long treasures. (Demetrios -a Ch. 6).

Alexander changed careers from theater to the California State Life Insurance Company, which set his family up for financial stability. Her friends and community saw Ray as relatively wealthy, contrasting with Charles Eames's upbringing.

Ray studied dance under Leila Maples, who had been a member of the Russian Ballet. She remembers Maples as a great, beautiful, strong, gentle, and strict teacher. From age three, Ray began drawing and displaying an early aptitude as an artist. (Koenig, Introduction),

(Demetrios -a Ch. 1). When Ray joined Sacramento High School's art club in high school, she continued to grow as an artist.

Alexander suffered a heart attack and died in July 1929. He was 56. His sudden death shocked the Kaiser family, and although they were well off, the stock market crash of 1929 put the family in a dire financial situation.

Ray graduated from Sacramento High School in February 1931 and then enrolled at Sacramento Junior College. Ray started applying to East Coast schools to attend in the summer. Ray and her mother wanted to be closer to Maurice at West Point, located on the western bank of the Hudson River, 40 miles north of Manhattan. Ray and her mother moved to New York in the fall of 1931, and Ray enrolled at the May Friend Bennett School in Millbrook, not far from West Point, and Edna lived in Manhattan. (Demetrios -a Ch. 6).






1. *2.* *3.* *4.*

1. *Ray Kaiser, 1913.* ***2.*** *1916.* ***3.*** *Sketches, ca. 1929 (Demetrios -b Ch. 1 Pg. 36.)* ***4.*** *1931 Sacramento High School Sr. Portrait (EamesInstitute.com)*

Ray's Art Education

Bennett was considered an outstanding finishing school in the lush Hudson River Valley. During Ray's time at Bennet, she stayed true to her father's influence in enjoying the natural world around her. Ray graduated in 1933 and moved to Manhattan, where she immersed herself in the vibrant city's culture. She frequented exhibitions and museums and enjoyed the nightlife. After

considering attending Cooper Union for engineering, her friend Helen Donnelly from Bennett introduced Ray to the Art Student's League, where she enrolled in 1933. Donnelly was a key player in bringing famed German Abstract Expressionist Hans Hofmann (Koenig, Introduction), a European émigré, to the school. Hofmann taught briefly at the Art Student's League before opening his school, the Hofmann School of Fine Arts. Ray signed up for his first classes at the school and studied under him for over six years. "…he was just a great teacher, and the point of view for him could be translated–I'm trying to think of someone similar, because I don't think that many of the people that we know as great painters are such great teachers. He really was." (Ray Eames, aaa.si.edu). She described her relationship with Hofmann as working *with* him rather than being his student. (Demetrios -a Ch. 6). Hofmann was considered a taskmaster and a strident believer in his students' understanding of the relationships in art between color and structure. (Koenig, Introduction). Although being a student of Hofmann was hard work, Ray intertwined work and play during her time with him.

"No one could enjoy life more than he, but as far as his teaching, it was structure and relationships, and color as structure." (Ray Eames, Demetrios -b Ch. 6).

Oil paintings: *Painted in the 1930s while studying with Hans Hofmann*

"Hofmann was very fond of [Ray] and very fond of her work. But, it was very different from everybody else's in the class. There was nobody doing anything like what she was doing." (Ben Baldwin, Demetrios -a Ch. 6).

In 1936, Ray was a founding member of the American Abstract Artists Group (A.A.A.), considered radical at the time. (Koenig Introduction). She devoted a great deal of energy to promoting the rights of modern artists, especially abstractionists, to have equal representation of their artwork in the city's galleries. The group discussed how Manhattan's mainstream museum community ignored abstract painters and sculptors. The A.A.A. achieved its goal of building the abstractionist community to find physical and intellectual places for artists to display their work. As the A.A.A. began to flourish, Ray turned her attention to project work and partnered with Ben Baldwin on a mural for one of his architectural projects. During this time, Ray became increasingly interested in architecture and how other disciplines in design are intertwined.

As the 1930s came to a close, Ray's mother's health was failing (cancer), and they relocated to St. Petersburg, Florida, in 1938, where Ray cared for her until she died in 1940. Maurice Kaiser graduated from West Point and pursued a distinguished military career, achieving the rank of colonel. (Demetrios -a Ch. 6).

On the advice of Ben Baldwin, Ray applied to the Cranbrook Academy of Art in Bloomfield Hills, Michigan, a suburb outside of Detroit.

The Cranbrook Academy of Art

Located in Bloomfield Hills, Michigan, the Cranbrook Academy of Art is a graduate-level art school that follows the principles of the Bauhaus movement, emphasizing the integration of art, craft, and design. The Cranbrook Academy of Art began teaching informal classes in 1922 and was sanctioned in 1932 by George Gough Booth and Ellen Scripps Booth. George Booth was a wealthy newspaper publisher and philanthropist, and his wife Ellen was also a prominent arts

supporter. They envisioned a unique educational institution fostering creativity and craftsmanship in various art forms. George and Ellen believed in contributing to the common good to have a place for the public, and what started as a 120-acre property organically became a sprawling 319-acre campus of the Cranbrook Academy of Art.

Finnish architect Eliel Saarinen designed the Academy grounds. (Cranbrook.edu). Saarinen was a celebrated Finnish architect and held the international honor of being the second-place design winner in the Chicago Tribune Tower competition in 1920, which led to an invitation to teach at the University of Michigan in Ann Arbor. Saarinen began work with Cranbrook in 1925 after the school had been open for three years, and he lived on campus until he died in 1950. (Demetrios -a Ch. 7). He designed the Cranbrook School, Art Museum, Academy of Art, and Science Museum. It became known for its innovative approach to art education and its commitment to nurturing the talents of emerging artists and designers and is known as the "incubator" of mid-century modernism.

Cranbrook Academy of Art
(CranbrookArt.edu)

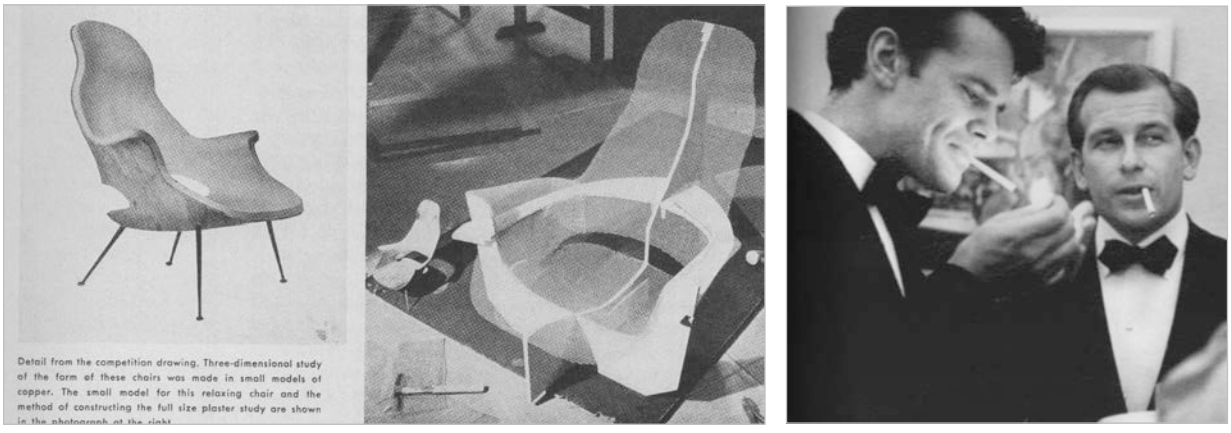
Charles arrived at the Cranbrook campus in September 1939. He left Catherine and Lucia in St. Louis, and this was another separation for the family. Charles joined the Architectural and Urban Planning program, and his studio mates were Ben Baldwin (Ray's friend) and Henry Reese (the future designer of the Washington, DC Mass-Transit System). While at the Academy, Charles met Eero Saarinen, the son of Eliel and Loja. Eero was an instructor at Cranbrook and once a junior partner at his father's firm (eventually named Saarinen and Saarinen). Charles and Eero connected and became lifelong friends, both professionally and personally.

Upon arrival at Cranbrook, Charles spent most of his time in the library reading rather than in his studio. When Charles was making, you could find him in the ceramics studio, the weaving studio, the darkroom, and even the metal shop.

"…he was obviously preparing himself for that wonderful, rich, and varied kind of practice that he had. He went beyond architecture, per se… he spent a lot of time in the darkroom, 'cause [he said], 'that's where the control is.'" (Ralph Rapson, Demetrios -a Ch. 7).

Eventually, Charles began working part-time at Saarinen and Saarinen. In 1940, Eliel asked Charles to design for what Cranbrook didn't have, a *design department*.

Catherine and Lucia joined Charles at Cranbrook for the 1939–40 school year and lived on campus in the faculty housing. Catherine took ceramic and weaving classes. As the 1940–41 school year approached, Charles was named head of the new Industrial Design Department. Catherine tried to fit in but missed St. Louis, and thus, the marriage began to deteriorate. They were officially separated during the summer of 1940. Catherine and Lucia moved back to St. Louis, leaving Charles in Michigan. Charles continued to teach but began to lose passion, and he wanted to devote his time to project work. He and Eero started working on designs for the Organic Design in Home Furnishings competition at the Museum of Modern Art (MoMA).



Left: *Organic Design in Home Furnishings entry (Ince, C., Johnson, L., & Barbican Ch. Pg. 21)* ***Right:*** *Eames and Eero at Cranbrook (Demetrios -b Ch. 2 Pg. 150)*

Charles and Ray

When Ray arrived on campus in 1940 to continue her art education by auditing Marianne Strengell's weaving class, she soon fell in love with the design and architecture crowd. *"Charles and Ray were two of the most private people imaginable... Unfortunately, this has meant that many of the private events of their life together, such as the precise moment they met and fell in love, were not recorded. But it did happen. It's just that the two people who really knew what happened are gone." (Eames Demetrios, Demetrios -a Ch. 8).*

Ray helped prepare the final Organic Design in Home Furnishings drawings for the MoMA competition. By the end of that time, the student-teacher relationship shifted to that of a romantic one. They wrote each other letters over Christmas break. While Ray preserved letters and postcards, Charles burned ones from Ray per their agreement. Although Charles and Catherine were separated, they were still married. In the winter of 1940, the Winter War in Finland (1939–44), World War II was underway, although the United States had not yet been called to action. By February 1941, with Europe in turmoil, Charles and Ray were committed to building a future together in California. Charles told Catherine that month he was ending the marriage and asked for a divorce. Charles and Catherine agreed that their daughter, Lucia, would still be part of his life wherever Charles went.

After divorcing Charles, Catherine pursued an academic career as Associate Dean of Women at Washington University in St. Louis. (Demetrios -a Ch. 8).

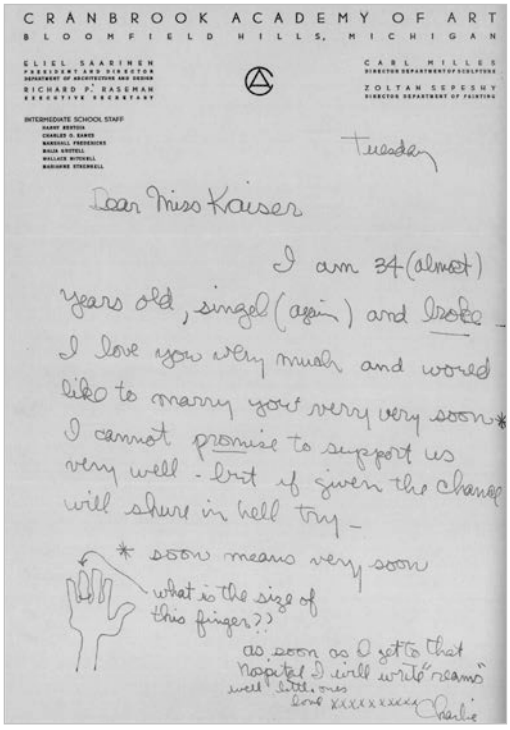
Around the same time Charles' marriage ended, MoMA announced that Charles and Eero's Organic Design in Home Furnishings entry was awarded first place. This meant their designs were guaranteed a manufacturer for production. (Ince, C., Johnson, L., & Barbican

Ch. 1). Charles and Eero submitted plans for a chair with exposed molded plywood formed into compound curves. The design was unique because the seat and seat back were united. Consistent with other entries, the designs were presented as images of full-scale plaster models.

Although the Eames–Saarinen entry won the legendary competition, the molding technology was not practical for production. The chair shells were laborious, expensive, and difficult to remove from the mold, splintering the chairs that needed upholstering. Eames and Saarinen had made the mistake of designing for form, not scale or production (Ince, C., Johnson, L., & Barbican Ch. 1).

In a summer of 1941 letter to Eliot Noyes, director of the Department of Industrial Design at MoMA, Charles said, "I suppose Eero has told you of our finally getting around to some cast iron dies. It makes me sick that we didn't insist on giving it a trial months ago." This was a difficult lesson to learn and a mistake that Charles was committed to not making again.

With Charles' divorce from Catherine finalized in May of 1941, Charles proposed to Ray in a letter, and she said *yes*. Charles and Ray were married on June 20, 1941, at Helen Donnelly's apartment in Chicago. Eero and Lily Saarinen, and Maurice Kaiser were in attendance. After the wedding, they drove to California in their new Ford, with little to their name other than a loan from Eero, from their theoretical chair royalties. (Demetrios -a Ch. 8).


CRANBROOK ACADEMY OF ART
BLOOMFIELD HILLS, MICHIGAN

ELIEL SAARINEN
PRESIDENT AND DIRECTOR
DEPARTMENT OF ARCHITECTURE AND DESIGN

RICHARD P. RASEMAN
EXECUTIVE SECRETARY

CARL MILLES
DIRECTOR DEPARTMENT OF SCULPTURE

ZOLTAN SEPESHY
DIRECTOR DEPARTMENT OF PAINTING

INTERMEDIATE SCHOOL STAFF

Tuesday

Dear Miss Kaiser

I am 34 (almost)
years old, single (again) and broke
I love you very much and would
like to marry you very very soon *
I cannot promise to support us
very well - but if given the chance
will shure in hell try -

* soon means very soon

what is the size of
this finger??

as soon as I get to that
hospital I will write "reams"
well little one
Love xxxxxxxx Charlie

Charles to Ray, 1941
(Demetrios -b Ch. 1 Pg. 46)

Eero Saarinen went on to design iconic buildings and monuments, including the General Motors Technical Center in Warren, Michigan, the Washington DC area Dulles Airport, the TWA Flight Center (now TWA Hotel) at John F. Kennedy International Airport in New York City, and the Gateway Arch in St. Louis.

California

Their first home in Los Angeles was at the Highland Hotel in Hollywood. They had few acquaintances in California and quickly made friends within the art community. Through John Entenza (publisher of the influential *Arts & Architecture* magazine), they met architect Richard Neutra who introduced them to his newly built Strathmore Apartments. (Koenig, Introduction). Their first design studio was in their second bedroom, and the Neutra apartments were the genesis of the Eames Office Design.

Ray began to design covers for *Arts & Architecture*, and Ray and Charles contributed articles to the magazine. Ray continued to paint, and her work was exhibited in the Los Angeles Museum. Charles worked as a draftsman for architectural set designs at MGM Studios. He served under the leadership of Cedric Gibbons. In 1942, Charles designed MGM dressing rooms, the backstage area for *I Married an Angel*, and the Hat Shop set for *Mrs. Miniver.* While this was just a job for a paycheck for Charles, it had its benefits. He wrote Lucia on the excitement of working at MGM Studios, even seeing Katherine Hepburn perform in *Woman of the Year*. And another time, he watched the MGM crew work with Leo the Lion, getting him to roar for the MGM logo sequence by teasing him with a steak. (Demetrios -a Ch. 8).

On nights and weekends, the Eameses continued to experiment with molded plywood. With the failure of manufacturability of the Eames–Saarinen molded-plywood MoMA designs,

they wanted to design a practical solution. They didn't blame the MoMA manufacturer because the young couple realized the importance of designing for manufacturability. (Ince, C., Johnson, L., & Barbican Ch. 1). They purchased tools from Sears, Roebuck & Co. and crammed them into their second-floor bedroom for iterative exploration. They were determined to learn *how* to make molded-plywood designs before what it would *look like.* The Eameses began to embark on an extraordinary quest to combine technology, form, materiality, and human-centered design as foundations of their design process. It was hard work, and each iteration was time-consuming but valuable and necessary to advancing molded-plywood furniture manufacturability. After months of iteration and prototyping, the Eameses created a process to bend molded plywood into a compound curved shell, thus inventing the Kazam! machine. Named for its sense of magic, the Kazam! machine enabled them to create furniture that *showed* the wood rather than *conceal* it. They finally pioneered the method to mass-produce molded plywood in compound curves to manufacture a single-piece shell, delivering a pleasing, comfortable form to sit on.

Kazam! machine: *The process involved laying a sheet of veneer in the form, heating it, putting a layer of glue on the wood, and repeating the process five and eleven times. The experimentation process was a deviation from the Organic MoMA chair. The new chair was created by layering veneer strips rather than a whole sheet. After the veneer was glued, a bicycle pump inflated a rubber balloon after the Kazam! had been tightly clamped to push the wood against the form, giving it its shape. (Ince, C., Johnson, L., & Barbican Ch. Pg. 25)*

Plywood Sculptures: *During the Kazam! trial period, Ray explored what else the machine could make. She experimented with molded-plywood sculptures, testing the limits of the technology while creating beautiful works of art. (Demetrios -b Ch. 1 Pg. 50–51)*

Plywood Sculpture: *Concept sketch, paper template, layered mockup, final form (EamesInstitute.com)*

Contributions to World War II War Effort

Dr. Wendall G. Scott visited the couple at their home during World War II. Dr. Scott served as part of the United States Medical Corp. and was a friend of Charles's from St. Louis, stationed in San Diego. During a casual conversation with the Eameses, he mentioned the Medical Corps's problem with transporting injured soldiers. The standard metal splints used to brace wounded World War II service members were heavy and rigid, causing further injuries due to the vibrations in the metal during transport. (EamesOffice.com).

Seeking a solution, Charles and Ray Eames experimented with their favorite material and technology–molded plywood. Charles took a leave of absence from MGM to focus entirely on finding a solution for the war effort. By harnessing the natural flexibility and strength of thin, layered wood, they envisioned a new kind of splint that would be lightweight, flexible, and moldable to the contours of the human body. This approach allowed them to create splints that

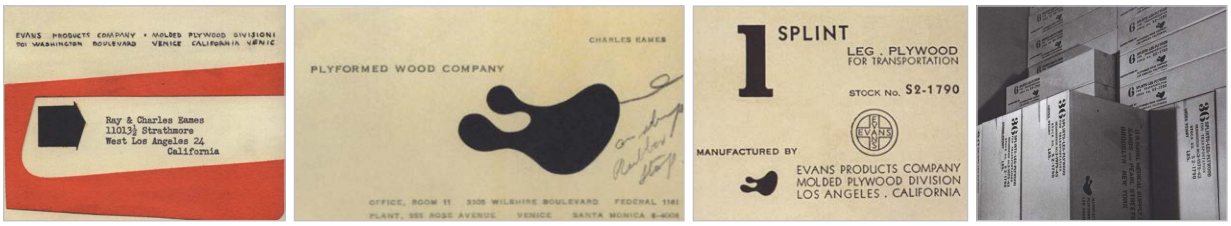
were not only functional but also comfortable, enhancing the soldiers' chances of recovery.

Molded-plywood leg splint *with a birch (left) and mahogany (right) veneer, ca. 1943. The shape of the leg splint served two important functions: it provided comfortable support to an individual's wounded leg and the form facilitated economy of space by stacking for safe shipping at the lowest possible cost. (Ince, C., Johnson, L., & Barbican Ch. 1 Pg. 27)*

The plywood splints combined the Eameses' deep understanding of ergonomics with their innovative approach to material use. They employed the Kazam! machine process by shaping the wood over a form to achieve the desired shape. Charles used his legs for model prototyping, ripping out all his leg hair. (EamesOffice.com). This technique allowed them to craft splints that conformed precisely to the curves and angles of the human anatomy, providing optimal support and immobilization. Symmetrical holes relieved the bent plywood's stress and allowed the medic to thread bandages and wrappings. The Eameses characterized this as the perfect example of recognizing the constraints of a particular design problem and working within them for the best solution. This mindset became vital to their design process for the remainder of their careers. (Demetrios -a Ch. 4). The final splint prototype was accepted in 1942, and the United States Navy placed 5,000 orders. After the initial experiments ended, the Eames operation moved into what would become the Eames Office, located at 901 Washington Boulevard in Venice, California.

Charles and Ray established the Plyformed Wood Company in 1942. Due to the challenges of mass production and financing issues, the Eameses sold the rights to produce and distribute the splints to Edward S. Evans, head of the Evans Products Company in Detroit. The Plyformed Wood Company became the Molded Plywood Division, a West Coast Evans

subsidiary. In 1943, Charles was named Director of Research and Development. Ray designed the logo and packaging labels for the subsidiary.



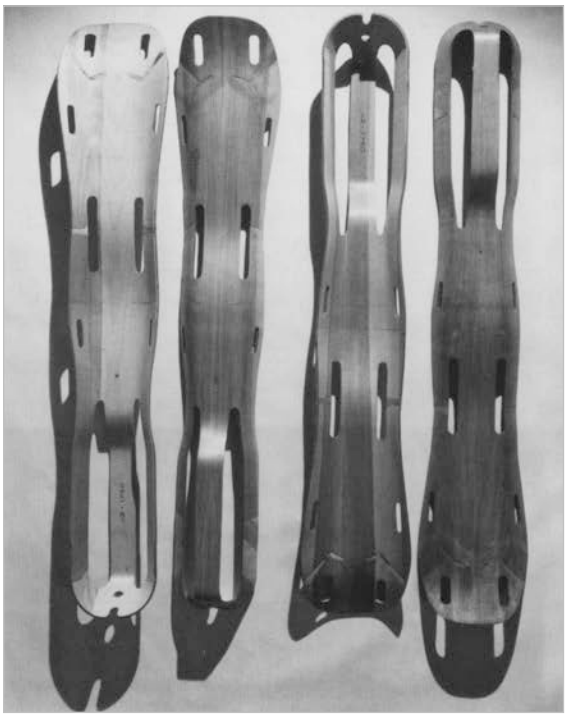
Shipping labels, business cards, and graphic packaging design by Ray Eames. *(Ince, C., Johnson, L., & Barbican Ch. 2 Pg. 28–29)*

"It also was an extremely honest use of materials, wedding the Eames understanding of the limits of the material to the functional needs of the splint. The splints represent a perfect example of utilizing to advantage what the Eameses called the constraints of a particular design problem. Recognizing and working within these constraints was always key to their design process. It was not always easy." (Eames Demetrios, EamesOffice.com).

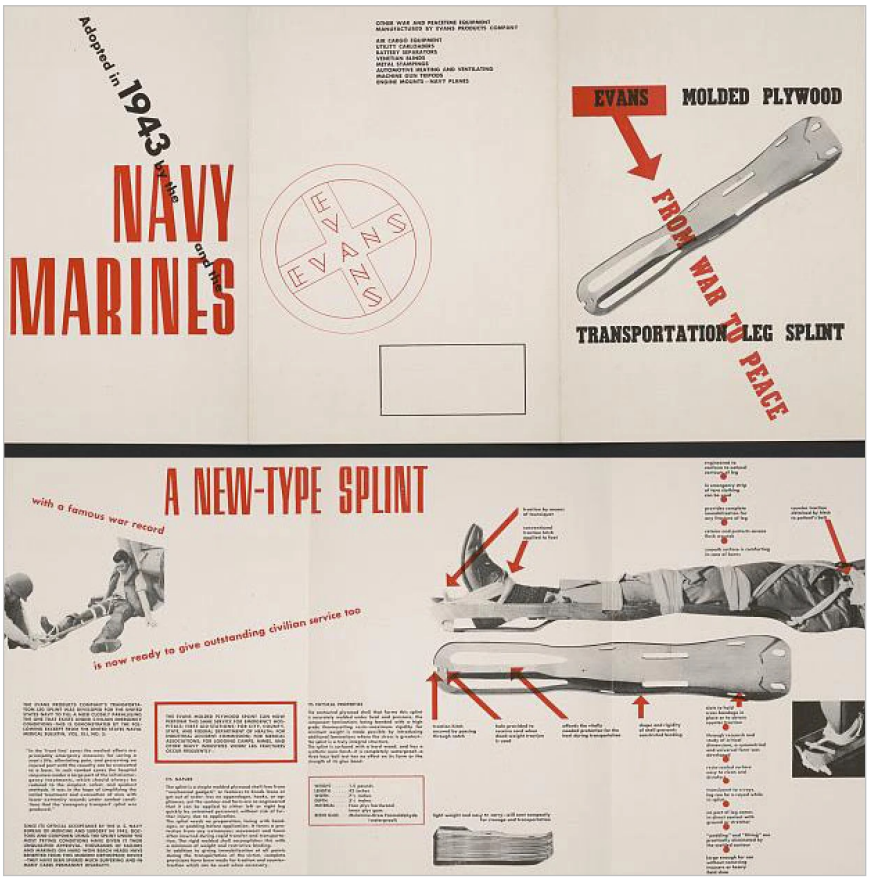
The Emergency Transport Splint revolutionized emergency medicine on the battlefield. In addition to the splint's functionality, it showcased a streamlined design aesthetic. The lightweight and organic forms they achieved with plywood were visually pleasing and minimized wastage and material usage, making them a sustainable solution. By the end of World War II, it is estimated that 150,000 splints were manufactured and used. (EamesOffice.com).

In this narrative of wartime innovation, the story of Charles and Ray Eames and their plywood splints is a testament to the power of human ingenuity and the profound impact that design can have in times of crisis.

Top: *Molded-plywood leg splint, produced during World War II.* ***Bottom:*** *Sculpture by Ray Eames, carved from a molded-plywood leg splint, ca. 1943. (Albrecht Ch. 3 Pg. 75).*



Left: *The U.S. Navy placed its first order for the splints in 1942, and the Plyformed Wood Company (essentially functioning as the Eames Office) mass-produced the item as a subsidiary of the Evans Products Company.*
Right: *A demonstration of the splint in use: Traction is applied to secure the broken bones and suspend the heel. (Demetrios -b Ch. 3 Pg. 112)*



'From War to Peace,' brochure for the transportation leg splint. *Ca. 1945. Photomechanical print on paper. The Eames Office designed the informational brochure, and it was an essential instructional tool for using the splint. The simple use of color and directional arrows informed the reader how to secure the splint, place limbs in traction to secure the broken bones, and suspend the heel using bandages. (Ince, C., Johnson, L., & Barbican, Ch. 1 Pg. 30–31).*

In 1945, as World War II was coming to a close, Charles and Ray had begun to "strike what would become their characteristic balance of idealistic vision and realistic implementation." (Demetrios -a Ch. 4). The impact of Charles and Ray Eames' plywood splints extended beyond the war years. Their innovative designs not only revolutionized the field of medical equipment but also paved the way for experimentation and exploration in furniture and product design. The lessons learned during this crucial period of their careers would continue to shape their future work and contribute to their status as design icons.

The 901: The Eames Office

Established in 1943, the Eames Office catalyzed design, innovation, and multidisciplinary exploration. The office, affectionately called "The 901," taken from its address, left an indelible mark on design, culture, and artistic expression.

One of the defining characteristics of The 901 was its approach to multidisciplinary design that embraces a range of creative disciplines. Charles and Ray believed in the power of play and cross-pollination that seamlessly blended architecture, furniture design, graphic design, photography, film, and the curation of exhibitions. This holistic approach to design allowed Eames designers to transcend traditional boundaries, infusing their work with unmatched exploration and innovation.

The most significant contribution of the Eames Office to the world of design was its pioneering work in molded plywood furniture. Long after the first Kazam!, Charles and Ray continued to push the boundaries of what was previously thought possible in furniture design.


Left: *The Eames Office (Demetrios -b Ch. 2 Pg. 68)* ***Right:*** *Inside the Eames Office (Demetrios -b Ch. 2 Pg. 71)*

Eames Office Archives

Charles Eames: *"For many years we have used photography as an information tool. As the information we needed to communicate developed greater urgency and complexity, we got more and more involved in the medium of motion picture—multi-image—collection of stills.".*

Charles and Ray Eames, alongside the Eames Office staff, photographed and developed hundreds of thousands of images over decades. They used photography to document and reconfigure a project as it progressed or formulate and express ideas. The photography archive room had a long wall with lightboxes, organizational files filled with Kodachrome slide negatives, and flat surfaces for gathering selections of photographs. The Eameses and their staff could pull visuals from these thousands of records when researching projects.

"Charles was always interested in documenting things, and using photographs rather than pages of explanations. He had a very strong belief of being able to see something rather than having to describe it, so we've always used photographs for that." (Ray Eames, EamesOffice.com)

After Charles passed away in 1978, Ray began readying the Eames Office's objects and photography for archival safekeeping at the Library of Congress (LOC) in Washington, D.C. The historic archive spans portraits of Charles and Ray, furniture production, artwork, patent drawings, film and slide show frames, oral history transcripts, exhibition research, architectural spaces, letter correspondence, molded plywood experiments, and photoshoots. These artifacts offer a

glimpse into the innovative thinking and multidisciplinary approach of the Eameses. Approximately 1.5 million two-dimensional objects such as letters, plans, artwork, and photographs are housed in the LOC's Manuscript Division and the Prints & Photographs Division. (EamesOffice.com). Today, the Eames Office is carefully archiving and digitizing these historic photographs. The Eames Office's decision to donate these artifacts reflects its commitment to preserving design history, fostering educational opportunities, and allowing future generations to access their influential work.

Major Projects

The Eames Lounge Chair and Ottoman

One of the most iconic examples of their molded plywood furniture was the Eames Lounge Chair (ELC), released in 1956. Most people who know the Eames name associate it with the Eames Lounge Chair and Ottoman. (Demetrios -a Ch. 14).

The Eames Lounge Chair and Ottoman origins can be traced back to the 1940s when Charles and Ray Eames began experimenting with molded plywood techniques. Inspired to create a chair combining ultimate comfort with exceptional aesthetics, they embarked on a design journey that would eventually give birth to an icon. The first iteration of the lounge chair emerged in 1945, known as the "Eames Lounge Chair Wood" or "LCW." The chair and ottoman featured a molded plywood shell designed for mass production. Pieces of the Eames Lounge con-

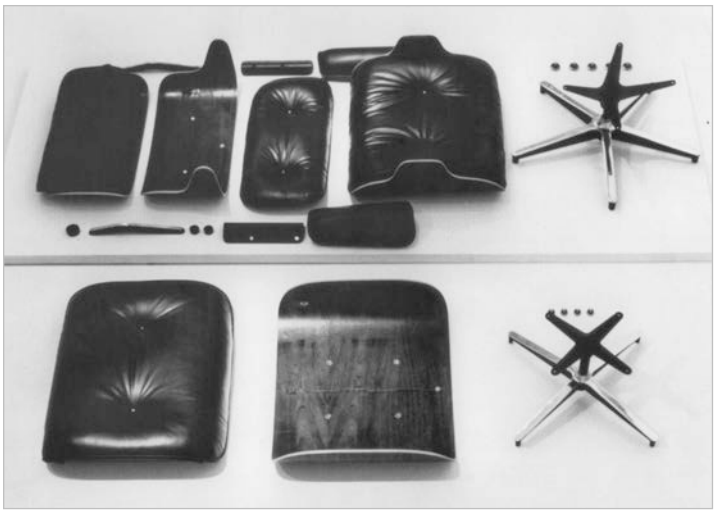
1945–1946: *the first iteration of the lounge chair was designed with interlocking pieces of molded plywood. (Albrecht Ch. 3 Pg. 84).*

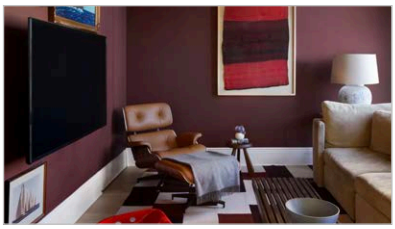
cept were dormant for nearly ten years before resurfacing as part of the 1956 chair. (Albrecht Ch. 3).

The Eames Lounge Chair and Ottoman debuted on NBC's *Home*. To accompany the chair and ottoman, the Eameses made a short film on the chair, in which Herman Miller's Dick Hoffman assembled, then disassembled the chair. The film focused on a narrative that simplifies the chair's parts, which told the story of its design roots in the Eameses' earlier experiments in molded plywood technology. Other presentations of the chair and ottoman emphasized their luxury and comfort qualities. The Eames Lounge Chair and Ottoman quickly gained recognition and symbolized modern luxury and sophistication. (Ince, C., Johnson, L., & Barbican Ch. 3). Its presence in notable films, television shows, and high-end interiors solidified its status as an icon of mid-century design.

What sets the Eames Lounge Chair and Ottoman apart is its timeless appeal. It effortlessly transcends design trends and remains as relevant and coveted today as it was upon its introduction. Its enduring popularity can be attributed to its exceptional craftsmanship, comfort, and ability to blend into various interior styles, from mid-century modern to contemporary.

***The Eames Lounge Chair and Ottoman**, 1956 (Albrecht Ch. 3 Pg. 85)*





Left: *The Eames Lounge Chair and Ottoman disassembled for its introduction on NBC's Home in 1956. (Demetrios -b Ch. 3 Pg. 128). Original NBC broadcast on YouTube.*

Right: *2021 (ArchitecturalDigest.com)*

Molded Plastic Chairs & Fiberglass Chairs

"We'd known the material from having found this surplus material for the house, for the window screens ... which was very satisfactory. It was developed for an entirely different reason–for lining aircraft [radar domes], and helmets and so forth, because it was strong." (Ray Eames, Demetrios -b Ch. 3).

In the late 1940s, there was a demand to produce inexpensive but high-quality furniture. The challenge was that Charles and Ray wanted to utilize existing mass production methods. When the U.S. Air Force delivered the first polyester plastic reinforced with fiberglass, it was considered a "wonder" material. The Eames Office wanted to use it for mass furniture production, but it was restricted to military applications. It was used on military aircraft as molded cones called "radomes." The radome was intended to protect delicate electric equipment from the elements.

Their first fiberglass armchair prototype was designed for the 1948 MoMa International Competition for Low-Cost Furniture Design. (Koenig Ch. 11). Their entry was constructed of stamped steel coated in neoprene, and they designed a system of armchair bases. (EamesOffice.-

com). Although they won second place, the MoMA jury well-received the system of armchair bases. The Eames Office collaborated with Michigan Furniture Company Herman Miller and Zenith Plastics from California to bring to market what would become their most successful chair design. (Ince, C., Johnson, L., & Barbican Ch. 3). Herman Miller refused to spend $80,000 for a steel stamping press, mainly because the new designs hadn't succeeded in the marketplace. As such, Charles and Ray turned to wartime technology and fiberglass molding, and they were determined to let the design evolve from an understanding of the manufacturing process. (Demetrios -a Ch. 9). The first chairs were built at Zenith Plastics using the latest tooling technology, including hydraulic presses for boat building. Zenith Plastics used the same fiberglass-reinforced plastic radar domes during World War II. Zenith proposed a $5,000 machinery cost, agreeing to pay half themselves, and Herman Miller paid the other $2,500. (EamesOffice.com).

Entry Panel: *MoMA's International Competition for Low-Cost Furniture Design, ca. 1950, showcasing chairs and armchairs and their system of chair bases. (Ince, C., Johnson, L., & Barbican Ch. 3 Pg. 140).*

The Eames' molded-plastic chair designs were characterized by their organic shapes, ergonomic contours, and elegant aesthetics. They aimed to create chairs that were visually appealing but also comfortable and practical for everyday use. The molded plastic and fiberglass chairs featured a contoured seat with a waterfall edge, providing ergonomic support and promoting healthy sitting postures.

Stacking fiberglass chairs, *(1957) are ideal for schools and commercial offices. (Ince, C., Johnson, L., & Barbican Ch. 3 Pg. 147).*

Because the chairs were lightweight and durable and offered a base system, they contrasted with other furniture designs,

representing the first commercial use of plastic for seating. The Eames chairs were popular in residential, public, and commercial office settings. They were available in various designs, including the Eames Molded Plastic Side Chair and the Eames Molded Plastic Armchair. The Eames chairs came in multiple colors, allowing versatility in different settings. The plastic material made them lightweight and easy to clean, adding to their practicality. The design demonstrated a consistent thread in Eames's work because the forms had integral finishes, aiding in their "long life" objective of service and performance. The Eames believed an applied finish, especially a painted one, could chip off over time. An integral finish, however, ages gracefully, if at all. The chairs had six interchangeable bases/legs, wood, metal, cast-aluminum pedestal with casters, a swivel style, a rocker version made of a birch on wire struts, and an "Eiffel Tower" struts option.

"We've always been aware of not even attempting to solve the problem of how people should sit, but rather arbitrarily accepting the way people do sit and operating within that framework." (Charles Eames, Demetrios -b Ch. 3).

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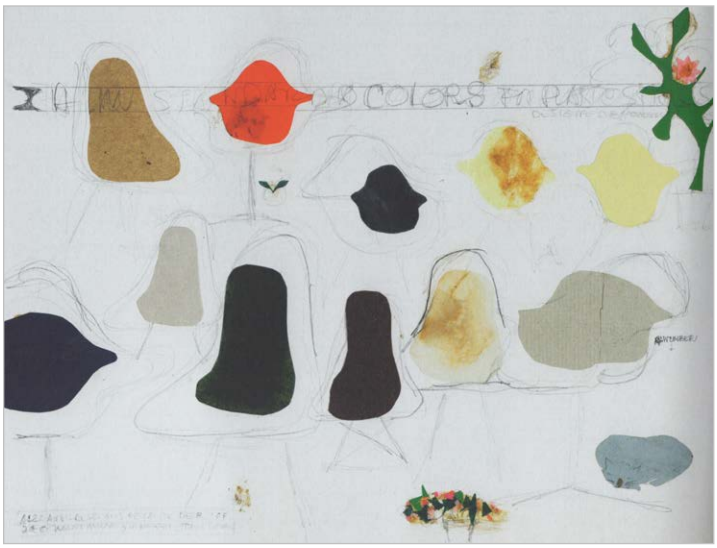

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1. *For proof of concept, the Eameses hired fiberglass fabricator John Wills to make two models of their arm shell shape in fiberglass. One of those two models is on display at The Henry Ford Museum (EamesOffice.com).* ***2.*** *Stackable fiberglass-reinforced plastic dining armchairs, 1954. (Albrecht Ch 3. Pg. 87).* ***3.*** *Study for chair shell colors, pencil, and collage on paper n.d. (Ince, C., Johnson, L., & Barbican Ch. 3 Pg. 146).* ***4.*** *Eames Molded Plastic Side Chairs and Armchairs, 2023 (EamesOffice.com).*

Case Study House No. 8; Eames House

Eames House, exterior *(Demetrios -b Ch. 9 Pg. 359)*

Case Study House No. 8, also called the Eames House, located in the Pacific Palisades area of Los Angeles, California, was one of roughly two dozen homes built as part of The Case

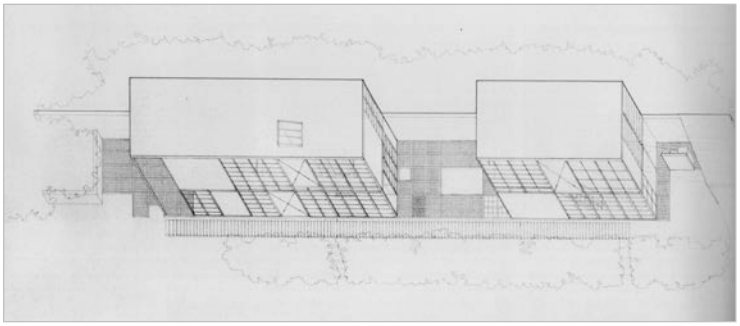
Study House Program. John Entenza, the editor and owner of *Arts & Architecture* magazine, spearheaded the program from the mid-1940s until its end in the mid-1960s. Entenza purchased the five-acre parcel from Will Rogers, then sold it to the Eameses when he launched the idealistic Case Study House Program. (Koenig Ch. 5). The first plan of the Eameses' home, the Bridge House, was designed in 1945 by Charles Eames and Eero Saarinen. (EamesOffice.com).

The home was completed in 1949, and Charles and Ray moved in on Christmas Eve. It was the center of productive activities and a "background for life in work." The Eames House played many roles. One functioned as a testing ground for experimentation, a workshop, a film studio, and a place for play. (Ince, C., Johnson, L., & Barbican Ch. 2). The space is known for its simplicity and lightness. The house wasn't designed as a static architectural item but came from the need of Charles and Ray to use it as a structure that could be adapted to their particular ways of working. The house consists of two prefabricated rectangular volumes connected by an open courtyard. The larger section, which served as the living space, featured floor-to-ceiling glass panels that provided abundant natural light and panoramic views of the surrounding landscape. The smaller section housed the studio and work areas. The exterior of the Eames House is designed in a grid of steel frames, filled with panels of translucent and opaque glass with brightly colored panels. This modular grid system allows for flexibility in configuring the interior spaces and encourages experimentation and creativity.

Today, Case Study House No. 8 Eames House is a significant architectural landmark, showcasing Charles and Ray's visionary approach to design, attention to detail, and commitment to merging usability, art, design, architecture, and everyday life. In 2004, Charles's daughter, Lucia Eames, created a non-profit organization called the Eames Foundation to preserve and protect

the Eames House to celebrate the creative legacy of Charles and Ray. (EamesOffice.com). It remains a source of inspiration and education for architects and designers, representing a timeless example of modern design principles and the enduring legacy of Charles and Ray Eames.

Charles, Lucia and Ray Eames, n.d. (EamesInstitute.com)



Axonometric of the Eames House *(Demetrios -b Ch. 9 Pg. 346)*

Eames House, interior *(ArchitectureHistory.org)*

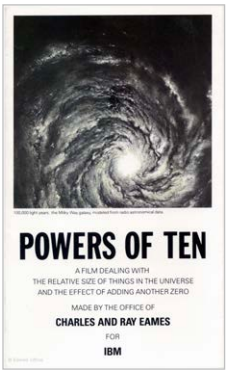
Article in Arts & Architecture magazine*, December 1949, showing the plans and construction of the Eames House, Case Study House No. 8. (Demetrios -b Ch. 9 Pg. 346–347).* ***House:*** *After Five Years of Living, a film by Charles Eames on YouTube.* ***Eames House Walkthrough*** *(1997) on YouTube.*

***Powers of Ten* (Film)**

The Eames *Powers of Ten* is a short film created by Charles and Ray Eames in 1977. The film is a 9.50-minute *adventure in magnitudes*. It is an exploration of scale and perspective, taking viewers on a visual journey from the vast expanse of the universe to the microscopic human world within a single atom.

The film begins with an overhead shot of a couple picnic in a park. It then zooms out by a factor of *ten* every ten seconds, revealing a broader view of the surrounding area, city, country, and eventually the Earth as it recedes into space. This zoom-out continues until it reaches the outer limits of the known universe, showcasing clusters of galaxies before a rapid return to Earth to the hand of the sleeping man in the picnic, moving inward every ten seconds until the view reaches the microscopic world.

The film is internationally recognized as a masterpiece and is used for teaching in schools, universities, and museums worldwide. It was narrated by physicist Philip Morrison and the music was composed by Elmer Bernstein. The Eames set out to demonstrate the power of scale in our everyday lives, and at every stage, the *Powers of Ten* is a portrait of the world as we knew it in 1977 (Koenig Ch. 24). *Powers of Ten* on YouTube.



Left: *Charles in a crane shooting the picnic scene for Powers of Ten (Demetrios -b Ch. 7 Pg. 268)*
Middle and right: *Picnic Scene and Powers of Ten brochure for IBM (EamesOffice.com)*

Eames Tandem Sling Seating

The Eames Tandem Sling Seating system was introduced in the 1960s. It is a versatile and flexible system designed for public spaces and waiting areas. It consists of a series of seats connected in a linear arrangement, allowing for efficient use of space while providing comfortable seating for multiple individuals.

Eero Saarinen Associates and C.F. Murphy Associates approached the Eames Office to design public seating for new terminals at Dulles Airport in Washington, DC, and Chicago's O'Hare Airport. In the late 1950s, flying became an increasingly popular travel method, and new airports and facilities were being built worldwide to accommodate the growing number of passengers. (Koenig, Ch. 20). The Eames Office had experimented with Stadium Seating in 1954, using their fiberglass armchairs fastened with a steel beam. Although this project never passed the prototype phase, it served as the jumping-off point for the tandem sling seating. The Eames team traded steel beams with polished aluminum frames and replaced one-piece slings with interchangeable/replaceable seats and seat backs that could be replaced due to damage. The project was dedicated to rigorous technical and durability tests because Charles and Ray understood that the design would require resistance to wear and tear.

Eames Tandem Sling Seating. *London Waterloo Station n.d. (Koenig Ch. 20 Pg. 76).*

"Upon completing a mock-up, then a prototype, the Eames Office put the seating through basic tests. Herman Miller's Technical Center subjected this prototype to the following tests: a 100-lb padded weight was dropped in a 5-in. free-fall onto a seat pad 15,000 times; arm, seat, and back-pad materials were subjected to 100,000 cycles on a Wyzenbeek abrasive test machine; seat and back-pad material were chilled at -15F for 30 minutes, then folded and run through a

wringer; seat and back-pad material were exposed to 120 hours of ultraviolet light, 65-70 percent relative humidity, and to 105F° ambient temperature." (Hugh DePree, Herman Miller, Eames.com).

Eames Tandem Sling Seating polished aluminum details. *(Demetrios -b Ch. 3 Pg. 150). Charles and Ray dedicated their design careers to craftsmanship and attention to detail. The relationship between craftsmanship and furniture design goes beyond the technical aspects of construction. It involves a profound understanding of materials, aesthetics, and user experience. Craftsmanship in furniture design uses traditional methods like woodworking, joinery, and carving. The Eames Office Aluminum Group designed the Sling Seating to sustain wear and tear and function as part of a good user experience. The smooth lines of the aluminum joinery provide aesthetic value, ergonomics, and user safety. (Demetrios -a Ch. 14).*

Left: *Eames Tandem Sling Seating. Dulles International Airport,1963 (HermanMiller.com).* ***Right:*** *James Sommers, reading a newspaper on The Tandem Sling seating. n.d. (Demetrios -b Ch. 3 Pg. 151). The heavy-duty steel T-beam took all the weight and was cleverly hidden from view with the sides and frame made with polished aluminum.*

House of Cards

"Toys and games are not really as innocent as they look. Toys and games are the preludes to serious ideas." (Charles Eames, Demetrios -b Ch. 5)

***The House of Cards** is a set of two fifty-four-card decks; the package explains, "every one different, a super collection of 54 colorful cards made to build with." Images for the pattern deck (featuring colored papers, fabrics, textures, etc.) and the picture deck (featuring animal, vegetable, and mineral kingdoms) were carefully selected by the Eameses. Most were photographed in the studio of the Eames House. (Demetrios -b Ch. 5 Pg. 212–13).*

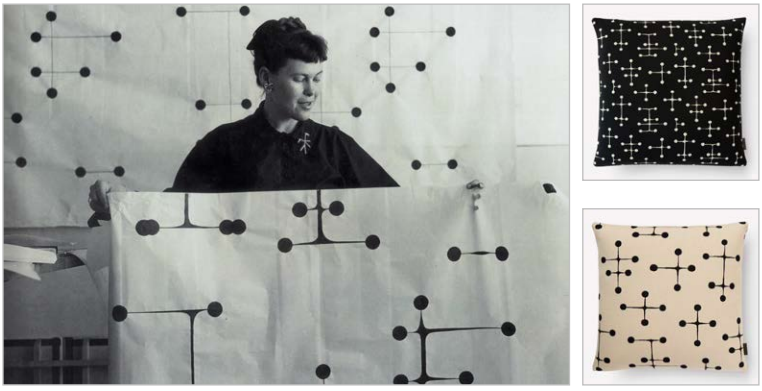
***House of Cards, pattern deck:** The notches on House of Cards made them easier to build, as Charles Eames demonstrated in 1952. The idea was to create space construction as easy as possible for children. The notches more elegantly solve the problem of connections: no more dowels or wireframes and no tools. (HermanMiller.com).*

Graphics and Textiles

"I never gave up painting, I just changed my palette." (Ray Eames, Demetrios -b Ch. 4).

Ray's approach to textile design was characterized by her deep appreciation for color, pattern, and texture. She drew inspiration from various sources, including art, nature, graphic

design, and travel. Her designs often featured bold and vibrant patterns, combining geometric shapes, abstract motifs, and organic forms. Ray experimented with different techniques and materials, pushing the boundaries of traditional textile design and creating visually striking textiles but also functional and durable. Although Ray didn't see some of her iconic prints produced during her lifetime, Lucia Eames and Mary Murphy of Maharam resurrected the pattern from Ray's original drawings and transformed them into cotton/polyester textiles in 1999. (EamesOffice.com).



Left: *Created in 1947, the Dot Pattern has survived as the most recognized textile design by Ray Eames.* ***Right:*** *Dot Pattern Pillows, 2023 (EamesOffice.com)*

Arts & Architecture Cover Designs

Arts & Architecture Magazine Covers, 1942-1947
Ray designed over twenty-five covers for Arts & Architecture. Arts & Architecture was owned, edited, and published by John Entenza. Some of the covers incorporate drawings and photographs by Charles. The covers are considered part of Charles and Ray's body of work at the Eames Office and often reflect the nature of their collaboration. (Demetrios -b Ch. 4 Pg. 164–65).

Shared Design Philosophy and Principles Summary

Functionality as a Guiding Principle

The Eameses strongly believed in the principle of form following function, prioritizing the practicality and usability of their designs. They sought to create furniture and objects that looked aesthetically pleasing, served a purpose, and enhanced the user's experience. Thoughtful ergonomics and attention to detail characterized their designs, ensuring functionality was central to every creation. This core principle tied them to considering the mass production and manufacturability of their products. Furthermore, their forms facilitated the economy of space by stacking or nesting for safe shipping at the lowest possible cost.

Emphasis on Design Innovation

Charles and Ray pushed the boundaries of creativity and explored new materials and techniques. They were pioneers in utilizing molded plywood, plastic, fiberglass, and aluminum in their furniture designs, revolutionizing the industry and creating iconic pieces that seamlessly combined form and function.

Integrating Technology and Design

The Eameses embraced technological advancements, new materials, and fabricating processes in their design work. They deeply understood the relationship between technology and design and harnessed new manufacturing processes and materials to produce innovative furniture and visually unique and technologically advanced products. The iconic Eames Lounge Chair and Ot-

toman embodied this by combining molded plywood, leather upholstery, and an innovative suspension system.

Multi-disciplinary Approach

Beyond furniture, the Eameses explored architecture, film, photography, and graphic design, showcasing their commitment to innovation and functionality across various fields. Their interdisciplinary approach allowed them to explore new ideas and experiment with multiple mediums, resulting in groundbreaking contributions to each field.

Commitment to Education

Advice to students crafted in 1949 (Ince, C., Johnson, L., & Barbican Ch. 1)

> *Make a list of books*
> *Develop a curiosity*
> *Look at things as though for the first time*
> *Think of things in relation to each other*
> *Always think of the next larger thing*
> *Avoid the 'pat' answer - the formula*
> *Avoid the preconceived idea*
> *Study well objects made past recent and ancient but never*
> *without the technological and social conditions responsible*
> *Prepare yourself to search out the true need–physical, psychological*
> *Prepare yourself to intelligently fill that need*
> *The art is not something you apply to your work—The art is the way you*
> *do your work, a result of your attitude towards it*

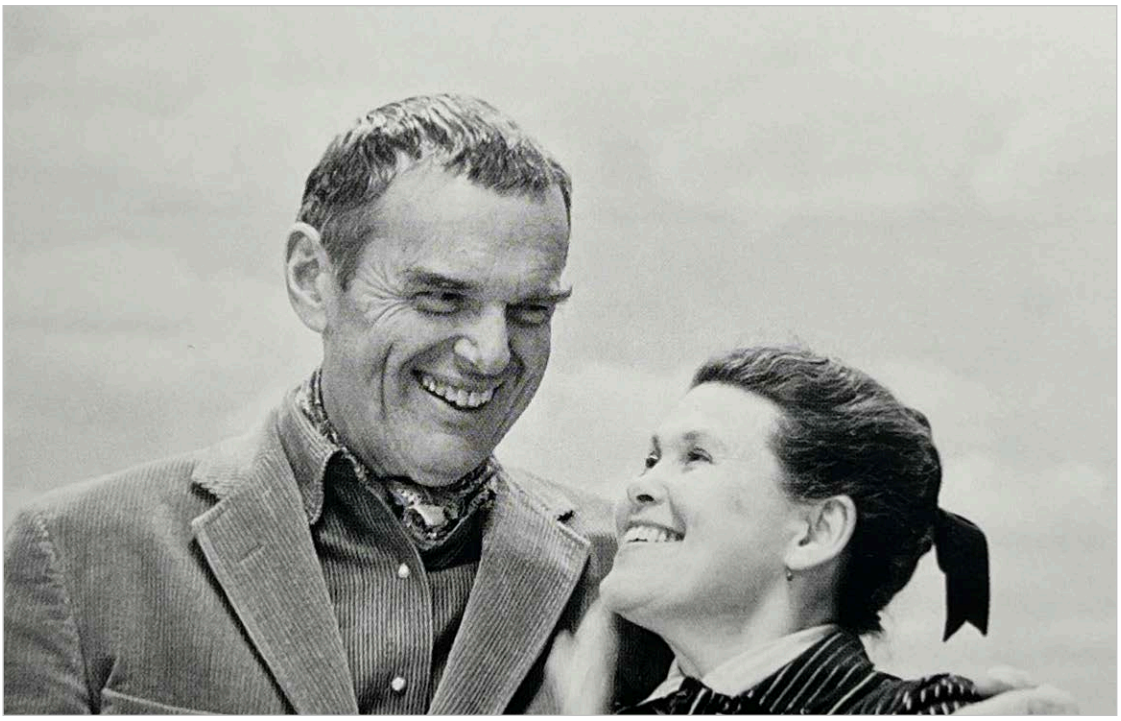
Conclusion

The Eameses' influence extends far beyond their specific designs and projects. Their philosophy emphasized the importance of interdisciplinary collaboration, bridging the gap between art, design, science, and technology. They believed in creating designs that catered to the user's needs while considering the broader social and cultural context. Their holistic approach to design, which integrated form and function, aesthetics and efficiency, continues to inspire and shape the work of designers, architects, and artists worldwide.

Charles and Ray pushed the boundaries of creativity and explored new materials and techniques. They pioneered molded plywood and other materials in their furniture designs, revolutionizing the industry and creating iconic pieces seamlessly combining form and function, integrating technology and design.

Charles and Ray Eames have left an indelible mark on design. Their human-centered design and innovative thinking, interdisciplinary approach, and commitment to creating beautiful and functional designs have had a profound and lasting impact on architecture, furniture design and manufacturing, graphic design, and filmmaking. Their work continues to be celebrated and is a testament to the power of creativity and collaboration in shaping our designed and built environment.

Charles and Ray, 1970s (Demetrios -b Ch. 1 Pg. 59).



Charles Eames
June 17, 1907–August 21, 1978

Ray Eames
December 15, 1912–August 21, 1988

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