Charles and Ray Eames are among the most celebrated designers of the twentieth century. The Eameses' lifelong partnership began in 1941 and their unique collaboration yielded a vast body of pioneering and influential design. This extraordinary work took place at the Eames Office in Venice, California: an interdisciplinary 'laboratory', active for over four decades, where the Eameses and their collaborators and staff researched and developed products, furniture, graphics, architectural and exhibition projects, as well as new models for education. They favoured the mediums of film and photography and throughout their lifetime made over one hundred short films and amassed an extensive body of photography used across print media, film and multi-screen lectures. Charles and Ray Eames' preoccupation with different modes of visual communication led them to produce ground-breaking multimedia architecture projects, which aimed to popularise burgeoning computer technologies or present new visions of America in the context of the Cold War.

This is the first retrospective of the work of Charles and Ray Eames in the UK for fifteen years and explores the variety of worlds in which the designers lived and worked, from their first years together developing new products for the war effort and the adaptation of these material experiments for furniture during peacetime, to their home, studio, and international network of clients and friends. It brings together important examples of the most recognised Eames Office designs alongside experimental prototypes and rarely seen works in film, photography, and architecture and installation design.

The remarkable story of the Eames Office is that of the trajectory of visual and material culture in the post-war period of the last century. Charles and Ray Eames moved fluidly between the mass-production of objects for everyday use and the transmission of ideas in anticipation of the global 'information age'. They were driven by philosophical ideals that valued knowledge, discovery and discipline; embraced the potential of technology and science for the common good; and saw no separation between life and work.

The exhibition begins on the lower level.

LIFE IN WORK

Charles and Ray Eames moved to Los Angeles in 1941. In California they found a new creative and cultural environment suited to their interests and working life: modernist aesthetics and progressive social ideals flourished, and the local film and manufacturing industries provided a hotbed of productivity and innovation crucial to their experiments in design, architecture and image-making. Initially, Charles worked in the art department at MGM Studios and the couple undertook their creative pursuits in a makeshift studio space at home. As well as making furniture and objects for their new apartment, the Eameses began to experiment with new ways to mould plywood in three dimensions for application to furniture production.

The Second World War provided the opportunity to test and refine their moulding plywood technique; in 1942 the couple designed a revolutionary new transportation leg splint for emergency use on the front line. Following an intense period of trial-and-error research, the Eameses won a US Naval contract. In order to develop the tooling and produce the first batch of 5,000 splints they called on friends and associates to form the Plyformed Wood Company. The group initially included the British set designer Margaret Harris, sculptor Marion Overby, and architects Gregory Ain and Griswold Raetze, who were later joined by designer Harry Bertoia and photographer and graphic designer Herbert Matter, among others. The Eameses had forged a friendship with *Arts & Architecture* editor John Entenza and began contributing work and ideas to the magazine on a regular basis; Entenza was also closely involved in the running of Plyformed Wood. The company encountered financial problems and in 1943 Charles entered into talks with Colonel Edward S. Evans, head of Evans Products Company, a Detroit-based manufacturer and lumber supplier, to support the production and distribution of the splints. By October the Plyformed Wood Company became the Molded Plywood Division, a West Coast subsidiary of Evans Products Company. Charles was named 'Director of Research and Development'. Operations expanded as more military contracts were taken on and by the end of the year the company (with the exception of splint production) had moved to 901 Washington Boulevard in Venice, Los Angeles, which was to become the home of the Eames Office for the next forty-five years. As demand for military products dwindled, the Eameses' earlier experimentation with furniture resumed with renewed intensity.

Ray Kaiser (1912–1988) was born in Sacramento, California, and trained as a painter. Born in St Louis, Missouri, Charles Eames (1907–1978) demonstrated an interest in photography from an early age before going on to study architecture. The couple met in 1940 at the Cranbrook Academy of Art in Bloomfield Hills, Michigan, shortly after Charles became head of the Academy's Department of Industrial Design and Ray had enrolled as a student. Under the directorship of Finnish architect Eliel Saarinen, Cranbrook's curriculum fused the values of the arts and crafts movement with the visionary thinking represented in Europe by such schools as the Bauhaus. As an American crucible of modernism, the academy played a vital role in the development of Charles and Ray's conception of modern design. In 1940 Charles collaborated with his friend and fellow instructor Eero Saarinen, Eliel's son, on designs for The Museum of Modern Art's 'Organic Design in Home Furnishings' competition. They were assisted in the preparation of submission drawings and models by Ray and fellow student Don Albinson, who would later become an important member of the Eames Office. This was to be the first of many fruitful experiments in shaping organic forms with new moulding techniques. Charles' friendship with Ray blossomed. In May 1941 he divorced his first wife Catherine Woermann, and in June of that year he and Ray were married and relocated to Los Angeles almost immediately.

AT HOME WITH THE EAMESES

In 1945 *Arts & Architecture* magazine launched the seminal Case Study House programme, initially commissioning eight California-based architects to design and build modern homes in response to the needs of specific clients and locations. Charles and Ray Eames designed Case Study House No. 8 for themselves and collaborated with architect Eero Saarinen on Case Study House No. 9, designed for *Arts & Architecture* editor John Entenza.

The Eames House was published in *Arts & Architecture* in December 1949, the month it was completed and the couple moved in. For the Eameses, the house was to be the centre of productive activities and a 'background for life in work'. It is the most potent and iconic expression of their attitude towards living, and marked a new take on the modernist principles of the preceding decades; although faithful to the edict of 'truth to materials', the Eames House is pragmatic, unselfconscious and informal. It is remarkable for its simplicity and lightness. The alternating use of painted panels and glass on the façade creates kaleidoscopic effects of light and shade on the interior, effects elaborated by shadows and reflections of foliage on either side of the windows. The house was not conceived as a static architectural object, but as a structure that could be effortlessly adapted to the Eameses' particular ways of living and working. Like an exhibition space or theatre set, over time this shifting backdrop generated a dynamic constellation of relationships between inhabitants, objects and space. The Eames House is, in the words of British architects Alison and Peter Smithson, 'architecture as a direct result of a way of life'.

Reflecting on the process of designing the house, Charles and Ray described their use of off-the-shelf standardised materials, the importance of the adjacent meadow to the building and site, and the challenge of combining these elements to achieve a structure suited to their needs. 'It's like a game,' Charles said, 'building something out of found objects, which is the nicest kind of exercise you can do.' In the preceding years this game had already begun with their work in furniture and continued long after the construction of the Eames House with their further experiments in design, and with toys, images and film-making. This hands-on, improvisatory and inventive approach to design has come to define the Eameses' legacy and wide appeal.

The objective is the simple thing of getting the best to the greatest number of people for the least.
Charles and Ray Eames, 1950

Charles and Ray Eames saw design not as the pursuit of originality for its own sake, but as a process of thinking about problems and their connection to surrounding historical, social and technological conditions. Their original and rigorous approach yielded some of the most innovative designs of the twentieth century. In the late 1940s the challenge was to produce inexpensive high-quality furniture using existing methods of manufacturing. In 1948, with the Eames Office now firmly established at 901 Washington Boulevard, the Eameses entered The Museum of Modern Art's 'International Competition for Low-Cost Furniture Design', which sought new designs for seating and storage units with potential for mass manufacture. Working with the engineering department at the University of California, Los Angeles, the Eames Office submitted a series of competition boards and full-scale model chairs in stamped aluminium, which were a step closer towards realising their goal to mass-produce a single-piece chair shell.

By 1950, having exploited technical and material advances in plastics made during the war years, the Eames Office, collaborating with Herman Miller and Zenith Plastics, brought to market their most successful furniture design: the fibreglass-reinforced plastic chair. The lightweight and durable moulded plastic chairs were an instant critical and commercial success. Different bases were introduced, such as the stacking and bench versions, making them the ideal product for high-volume use in schools, stadiums and public spaces.

The Herman Miller Furniture Company continued to work with the Eames Office on new designs and in 1957 Vitra, the family-run Swiss manufacturer, were granted a licence to produce Herman Miller furniture for the European market. Both companies still make Eames products today.

INFORMATION MACHINES

Communication is what links any living organism together.
Charles Eames, 1953

The 'Information Machine' was a multimedia experience conceived by the Eames Office for the IBM Pavilion at the 1964–65 New York World's Fair, but its title can also serve as a metaphor for the Office itself, encapsulating the Eameses' approach to work, especially those large-scale, communications-led projects undertaken from the late 1950s onwards. Charles and Ray Eames and their team tackled a range of topics, from history, the sciences and philosophy to architecture and urban planning, and took a great deal of time – and care – to understand deeply the subjects on which they were working. At times, specialist consultants from a wide field of disciplines were engaged to complement the research carried out by Eames Office staff, and although certain themes appeared with regularity – information theory or the history of science, for example – no project was the same. Throughout their development, concepts were modelled in a range of ways for different purposes. These working models were valuable tools that enabled Charles, Ray and their team to maintain focus on the concept driving the whole endeavour. In their final form, ideas were communicated in a medium best suited to the project's requirements, whether that be a short film, a multi-image or multimedia presentation, a three-screen slide lecture, an exhibition, a report or interactive display devices.

In 1975 Charles delivered a talk entitled 'An Architectural Model is an Information Device'. Notes for the talk provide valuable insight into his thinking and the methods the Eames Office developed to communicate ideas: 'We have the capacity to absorb large numbers of impressions quickly. What we need to do is take greater advantage of this capacity. In this way we can get more information out to people effectively. This is a challenge that faces us as designers, as architects, as businessmen and as people who want to get some of the problems of the world ironed out.'

A Rough Sketch for a Sample Lesson for a Hypothetical Course, the 1953 pioneering experiment in interdisciplinary teaching, was in many ways a test run for *Glimpses of the U.S.A.* (1959), the Eameses' first attempt to communicate a wealth of information quickly and at a monumental scale. This seven-screen immersive film was made for the American National Exhibition in Moscow and incorporated some two thousand images in a filmic montage. The information-overload tactic was successful because the film's fundamental idea was simple and orchestrated with precision. This approach was employed on a much greater scale five years later for the IBM Pavilion. Exhibitions were also abundant with information; *A Computer Perspective* (1971–75) and *The World of Franklin and Jefferson* (1975–76) were dense displays, rich in detail and objects.

Tony Benn, the British politician and friend of Charles and Ray Eames, captured the essence of the Eameses' legacy in his tribute to Charles given at the American Embassy in London in 1978: 'that quality of analysis was, and is, very much needed at this time in history when the human race has to come to terms with, and get used to, a completely new set of tools. He introduced us to the tools of our generation.'

IBM Pavilion

Part garden of delights, part vision of the future, the IBM Pavilion at the 1964–65 New York World's Fair was a compelling spectacle. Formal work on the pavilion, which was conceived by the Eames Office and Eero Saarinen and Associates, began in 1962. Saarinen – a friend of Charles and Ray's since their days together at the Cranbrook Academy of Art – had passed away in September 1961 as plans for the pavilion were taking shape, so his associates, Kevin Roche and John Dinkeloo, saw the project to fruition. The Eames Office and Saarinen and Associates planned the site together and the architects led on the development of large-scale infrastructure such as the Ovoid Theater (home to the 'Information Machine') and the plastic roof canopy supported by Cor-Ten steel 'trees', while the Eames Office concentrated on the design of exhibits, film presentations and signage. The design of the pavilion was welcoming and carnival-like, allowing IBM to introduce their latest products and services to the public in a relaxed atmosphere; the setting emphasised IBM's business strategy, which sought to communicate that, contrary to popular belief, advances in computer technologies were not sinister or dangerous, but a force for positive change. The fair ran for two six-month seasons (22 April–18 October 1964 and 21 April–17 October 1965) and received more than 185,000 visitors a day. For most people, a trip to the pavilion gave them their first direct interaction with a computer.

National Fisheries Center and Aquarium

Following a 1962 act of Congress requiring the development of a National Fisheries Center and Aquarium in Washington DC, the appointed architects Kevin Roche John Dinkeloo and Associates commissioned the Eames Office to work with them on the proposal. The progressive initiative was intended to house educational exhibitions, live-specimen galleries, an aquatic garden, a 30-metre-high greenhouse, research facilities and administrative offices; the Eames Office was asked to produce the exhibitions, graphics, films and other research material. Assisted by Malcolm Gordon, a member of the biology department at the University of California, Los Angeles, Office staff immersed themselves in research for the project. Tanks with marine habitats were set up at 901 so that staff could study behavioural patterns and understand how to convey them to visitors. They took numerous photographs and live footage, compiling them into a poetic three-screen slideshow, *Tanks*, and a short film, *A Small Hydromedusan: Polyorchis Haplus* (1970), which follows the movements of a diaphanous jellyfish.

As part of the formal proposal to Congress, the Office produced graphic panels and a meticulously executed scale model of the centre. They also created a film (1967) and a booklet (1969), each explaining the features of the centre and underlining the importance of such a project in terms of increasing the public's understanding of the natural world and the urgent need to protect the environment.

FOR MODERN LIVING

Wherever we go and whatever we do, design *is always with us – making itself felt in our lives. Physically, good design can go far to increase the efficiency of our actions. Spiritually it can add much to our enjoyment of things around us.*
Alexander Girard, 1949

The exhibition *For Modern Living* was staged at the Detroit Institute of Arts in 1949 and Alexander Girard led the organising committee. It intended to 'suggest new and interesting solutions to the many and varied problems of modern living'. Visitors to the exhibition were introduced to the historic development of modern design before being led through a hall of objects selected as 'symbols of a good life'. The last section of the exhibition presented a series of model rooms designed by key figures of the period including Charles and Ray Eames, Alvar Aalto, Florence Knoll, George Nelson and Eero Saarinen.

Charles and Ray Eames' room, recreated here, was not so much a showcase of modern furniture as emblematic of an *attitude* toward living. It included La Chaise (named after artist Gaston Lachaise and inspired by his sculpture *Floating Figure*, 1927), the full-scale model chaise longue produced for The Museum of Modern Art's 1948 'International Competition for Low-Cost Furniture'. The Eames Storage Units were also shown publicly for the first time, alongside Eames folding tables, plywood DCM chairs and an eclectic array of objects and accessories.

THE ART OF LIVING

In the late 1950s the Eameses continued to refine and extend their range of low-cost furniture for a broad consumer market while developing new executive-style seating, tables and contract furniture for domestic, commercial and public use. In 1956 Herman Miller launched the Eameses' Lounge Chair and Ottoman, a modern take on the traditional club chair, which has become a much-celebrated classic represented in museum collections worldwide. Endlessly fascinated by the potential of materials, the Eameses next experimented with aluminium – a malleable and lightweight metal with high tensile strength – and produced the Aluminium Group, a sculpturally elegant collection of chairs and tables. Their structural and material elements also formed the basis of the Tandem Seating range, a highly robust system first designed for public areas in airports. Like the Lounge Chair and Ottoman and Aluminium Group furniture, the Tandem Seating series is still in production and can be enjoyed on the walkway opposite this room. These designs have come to define the look and feel of our homes and working environments and can function as powerful symbols of lifestyle, status and culture. The Eameses' chairs – in all variations – also permeate the worlds of film and television, from the 'Mad Men' era of mid-century modern to the futuristic landscapes of sci-fi cinema.

What finally matters is that your house works the way you want it to.
And that it is a pleasant place to be in.
Ray Eames, 1959

The Eameses' conception of design was not limited to fundamental questions surrounding the production of specific objects, but represented a holistic philosophy about life in the modern world. Although later resistant to the notion of 'good design' promoted by The Museum of Modern Art in New York throughout the 1940s and 1950s, Charles and Ray Eames were integral to the mission and took part in several influential projects organised by MoMA and participating department stores during that period. In these exhibitions the Eameses' aesthetic echoed that of their own house and juxtaposed modern industrial designs with handcrafted objects, photographs, works of art or material drawn from the natural world. The same visual language was adopted for Eames Office displays conceived for Herman Miller showrooms from 1949 until the late 1960s. Eclectic and playful props and images were assembled to inspire the consumer to be individual and, above all, human in their day-to-day living. Both Charles and Ray possessed a sharp eye for scenography, but it was Ray who truly excelled in art direction. A highly organised and visual person, Ray kept detailed lists of objects to be used in arrangements in showrooms, exhibitions and photoshoots. The Eames Office's role in Herman Miller's showrooms extended to the graphic design of promotional materials for the displays, including posters, invitations and print advertising.

Celebration as a human need

Celebration is a human need that we must not, and cannot deny … celebration is not exclusive – it is the most inclusive human act.
Corita Kent

In the Eameses' eyes, even the most ordinary object was potential source material; they saw endless possibilities for creativity in the world around them. They amassed an array of everyday objects, decorative ornaments and toys over their lifetimes, both gifts from friends and objects picked up on their own travels to such varied countries as Mexico, Germany, India and Japan. They admired the meticulous craftsmanship and attention to materials often involved in the making of such objects. Despite the diversity of their collections, specific thematic strands could be picked out, including masks, kites, tops, boats and trains. From accurate scale models to whimsical toys, these objects found themselves as stars in the narratives of the Eameses' films, including *Traveling Boy* (1950), shown here, *Toccata for Toy Trains* (1957) and *Tops* (1969). It is thought that the collection of boats on display was intended to provide source material for an unrealised film. The Eameses would often play with masks and headpieces, such as the ones presented here, with friends when they visited the house and also incorporated them as props into exhibitions and showroom displays.

Charles and Ray Eames' interest in such objects was not merely for the sake of their authorship, but rather their form and meaning. They were sensitive to the idea of anonymous design in material culture. From the Indian lota to the Hopi kachina doll, they were interested in traditional forms that were passed down through generations, continually evolving but universally understood and celebrated. The Eameses were fascinated by the rituals and ceremonies of other cultures, as well as their material manifestations. The festivals and everyday customs specific to these cultures became the foundations of poetic films and slideshows.

SAMPLE LESSONS

Charles and Ray Eames were actively involved in educational contexts throughout their lifetimes. In 1952, in collaboration with George Nelson and Alexander Girard, they prepared what was perhaps the first public multimedia presentation in the United States to demonstrate a proposed course for the University of Georgia in Athens. *A Rough Sketch for a Sample Lesson for a Hypothetical Course* was founded on 'breaking down barriers between fields of learning' and incorporated graphics, film, music, slides, smells and commentaries to augment the experience. It put forward a radical pedagogical model for expanded attitudes towards teaching. The Eameses repeatedly returned to this philosophy and approach in their work, consistently employing multimedia techniques such as slideshows to condense complex ideas. They remained sought after for their conception of design as an enquiry into problem-solving and the transmission of ideas. Among other engagements, they led a monthly seminar for architecture students at the University of California, Berkeley, from 1953 to 1954; Charles was appointed Charles Eliot Norton Professor of Poetry at Harvard University for 1970–71; and in 1977 he was made Regents' Professor at the University of California, Los Angeles. Charles and Ray were also frequent attendees at the International Design Conference in Aspen, Colorado, which provided an opportunity for industry professionals to come together to discuss the expanding realm of design.

The medium of film provided another means of pedagogical expression. *A Communications Primer* (1953) addressed 'the need for a broader concept of what communication means and how it operates', advocating new information theories as useful tools. *Powers of Ten* (1968 and 1977), a series of films exploring the mathematical principle of the title, are remarkable investigations into how we understand and process information about the changing world around us.

India

The Eameses' most tangible contribution to the field of education was their role in the formation of the National Institute of Design (NID) in Ahmedabad, India. Commissioned by the Indian government, Charles and Ray submitted their *India Report* in 1958, responding to the challenges that India was facing in light of advances in design and technology. They recommended a new educational model that could bridge tradition and modernity, proposing an interdisciplinary board of governors. Their study provided the basis for NID, which remains one of the foremost schools of design today. The *India Report* begins with a 'sample lesson' from the early Sanskrit poem the *Bhagavad Gita*, which resonates with the Eameses' own ethos: 'You have the right to work, but for the work's sake only; you have no right to the fruits of work. Desire for the fruits of work must never be your motive in working.' For Charles and Ray Eames, process was everything.

Particularly in the past fifty years the world has gradually been finding out something that architects have always known, that is – that everything *is architecture. The problems of environment have become more and more interrelated. This is a sketch for a film that shows something of how large – and small – our environment is.*

The largest and smallest involve numbers too big and too little to conceive of. But *by using a logarithmic progression (the powers of ten) we can in a small and handle-able number like 34 describe the whole universe. It also shows the importance of the added zero.*

It is interesting that most of the images in the last part of the film are of information that can be gathered by satellite. It is also interesting that this information – which is absolutely necessary to guard the health of our earth – is the same information that nations keep as secrets. What is most *interesting is that the governments of the world will have to choose between their secrets and their planet earth.*

Notes on 'Powers of Ten'
Charles Eames, 1977