



"The engineer in his own way is an artist too – and not just a dead fish with a slide rule."

Jørgen Varming

STEENSEN VARMING

steensenvarming.com

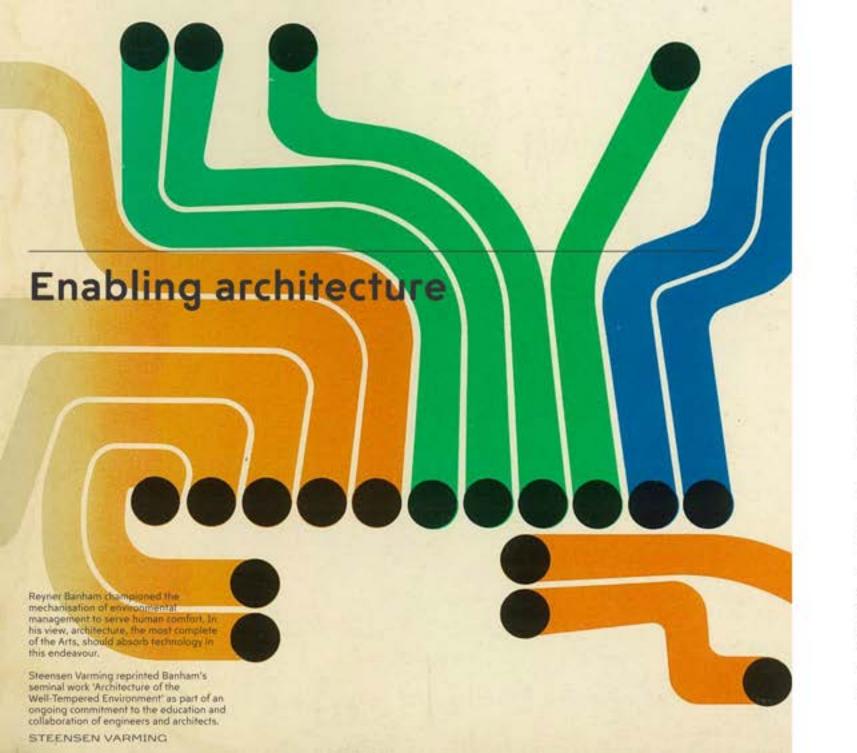
Firm foundations

We strive for technical perfection. We are driven to enable the best building design where functionality and wellbeing are paramount. We demand at least as much from ourselves as our clients and collaborators have come to expect.

We grew up with the Danish design approach to refinement and longevity in our formative years. Since our foundation, in 1933, we have attracted and employed gifted people with a shared ethos and commitment to optimal design solutions. We focus on offering a portfolio of specialist services and high levels of expertise, deliberately maintaining a scale of operation that does not outgrow our talent pool. We continue to innovate to meet and exceed the needs of the most challenging projects, to consistently deliver positive outcomes.

But it's not all about us. This book is about inspirational architects and brave clients. Our reputation, as one of the most respected and awarded building services consultancies, is built on their foundations - and our way of thinking.





Working in close cooperation with architects, engineers, scientists and designers, we have developed the knowledge to seamlessly assimilate form and function, art and technology. We are practitioners in mechanical and electrical engineering, lighting and sustainable designs that enhance spatial design. In addition to the Vitruvian principles of solidity, utility and beauty, we have put in place our own guiding triad to produce intelligent, valuable and elegant solutions.

These encompass architectural and urban design, the private, corporate and public sectors, modest upgrades and World Heritage Sites. Our integrated design innovations are often examples of quiet achievement with a profound effect on the success of a project, creating exceptional environments from combinations of active and passive measures. Its populace should not notice our legacy; when the efficient, seamless operation merges elegantly into the whole, we achieve our objective - total architecture.



In the happy old days now long ago, when time was passing smoothly and slow, we architects had such a happy mind, with no interference of any kind.

Then we could breathe so freely and fair, without this blasted conditioned air, but what we were taught then from our birth is now reduced to nothing of worth.

Who spoils the fun of the architect's task?
Who is the snake in the grass, you may ask?
Who will insist on these plant rooms and gears?
Who – but these confounded engineers.

Kristoffer Nyrop Varming Architect 1906

Translated by his son Jørgen Varming Engineer

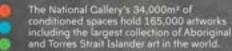
STEENSEN VARMING Page 15

Elegance

STEERISEN VARRING







In a long-term collaboration, operational conditions were maintained in the galleries while ageing, inefficient air handling equipment was replaced to give improved environmental control and very significant energy reductions of over 50% in gas and 30% in electricity usage.

National Gallery of Australia Canberra

The 200 log coffins of The Aboriginal Memorial at the National Gallery of Australia commemorate the indigenous people who have lost their lives defending their land since 1788. The fragile, natural pieces, created by 43 artists for this public space, need a controlled, clean environment with stable temperature and humidity.

A displacement air supply is concealed and integrated within the architecture, by PTW Architects, and the artwork itself. Air diffusers hidden in the gravel, cocoon the poles, and air curtains designed into the glazed façade, shield the space from excessive heat. This invisibly elegant solution allows visitors to experience the artwork unimpeded while preserving it for generations, even if the power is lost. The Utzon Centre, located on the Aalborg waterfront, was Jern Utzon's final project. As a boy, his playground was the Lim Fjord and Aalborg shipyard.

The striking and playful roof forms signal the dynamic meeting place at the School of Architecture. Linear LED light fittings, concealed in the roof parapet, throw even, warm light onto the metal-deck roofing, accentuating its soft curves and luminosity.

Utzon Centre Aalborg

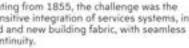






Dating from 1855, the challenge was the sensitive integration of services systems, in old and new building fabric, with seamless continuity.

The Mint was then listed as one of the top 30 groundbreaking buildings in the world by the Chartered Institution of Building Services Engineers.

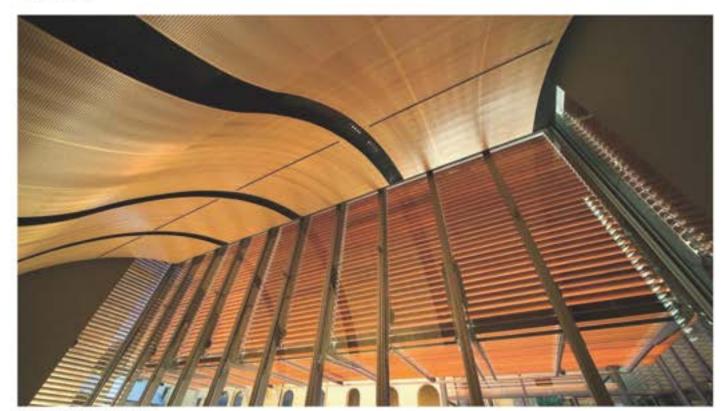




A luminous floating deck marks the gateway to the nation's capital and parliament. In a radical approach for vehicular infrastructure in the country, in-ground fittings uplight the soffit and reflect safe illumination levels for motorists.

A 92% reduction in traffic incidents has been reported since completion. Fittings can be maintained without disruption and the feature lighting colours can be programmed to celebrate major events.

The Mint Sydney



Kings Avenue Overpass Canberra



STEENSEN VARMING Page 27



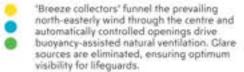
"Light is really the source of all being... all materials in nature are made of light which has been spent, and this crumpled mass called material casts a shadow, and the shadow belongs to light."

Louis Khan

STEENSEN VARMING Page 31





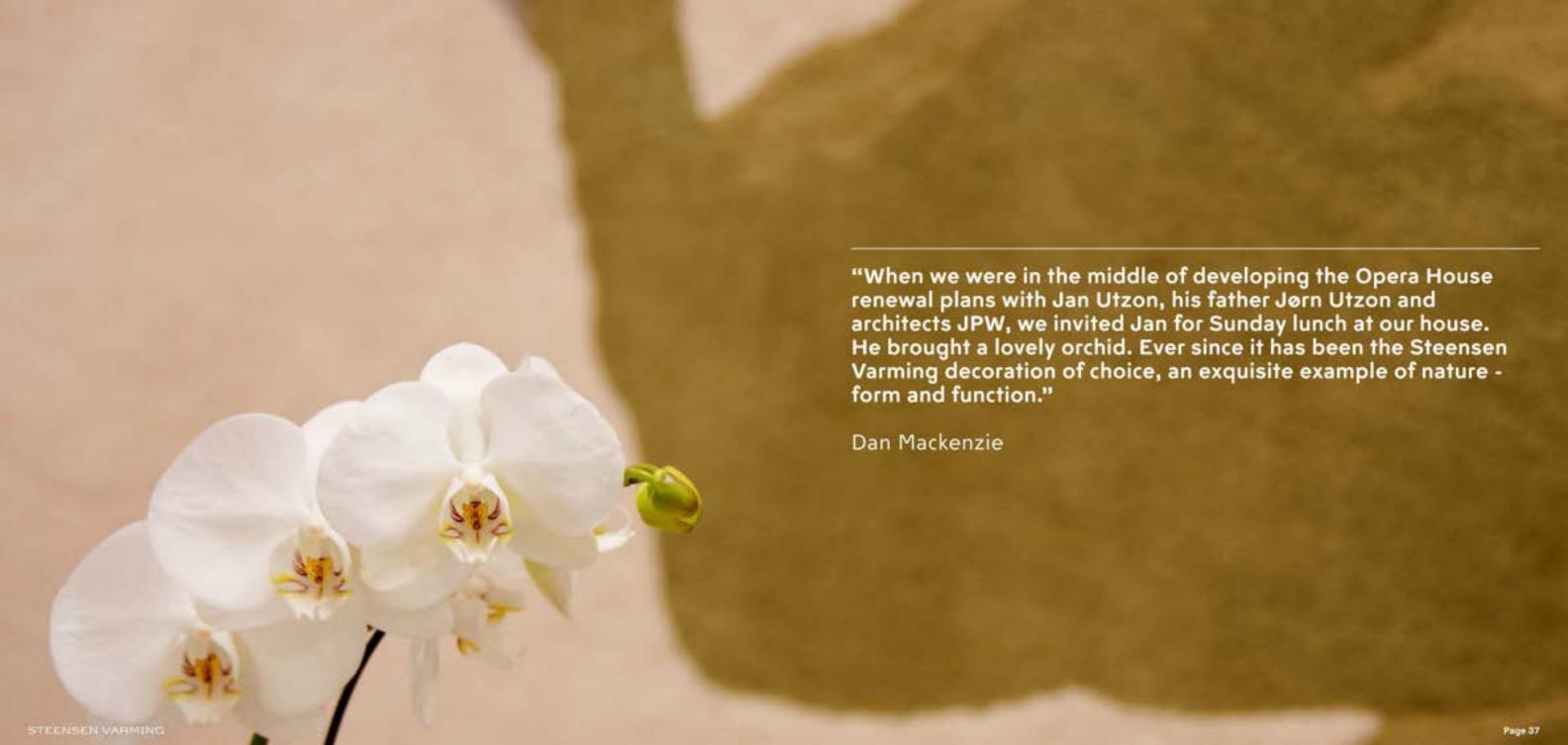


Corrosion resistant metal-halide wall washers uplight the profiled ceiling, enhancing the volume and form of the building. It is the first Australian project to receive an excellence award from the International Association of Lighting Designers.



Designed by Harry Seidler, and his final public masterpiece, the wave-shaped aquatic centre was named in honour of fivetime Olympic gold medallist Ian Thorpe. A major development by Sydney City Council, it inspires swimmers and sparked a residential building boom in a once-isolated industrial area of the city.

Steensen Varming designed the electrical, communication, security and lighting systems. The maximum application of natural ventilation and light, during the day, creates an outdoor environment indoors. In the dark, its glazed walls and lighting make the landmark building glow like a lantern.



Future







Integrating science, structure and services, we designed the infrastructure that maintains accurate conditions for the experiment.

Every day 70-100t of liquid CO₂ are delivered, stored, vaporised and released through the six arrays of 30 perforated vent pipes, 25m in diameter and 28m high. A sophisticated control system monitors wind speed and direction, and adjusts the CO₂ supply with pneumatic butterfly valves.

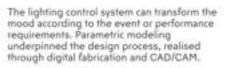


The Eucalyptus woodland free-air CO₂ enrichment (EucFACE) facility, Sydney

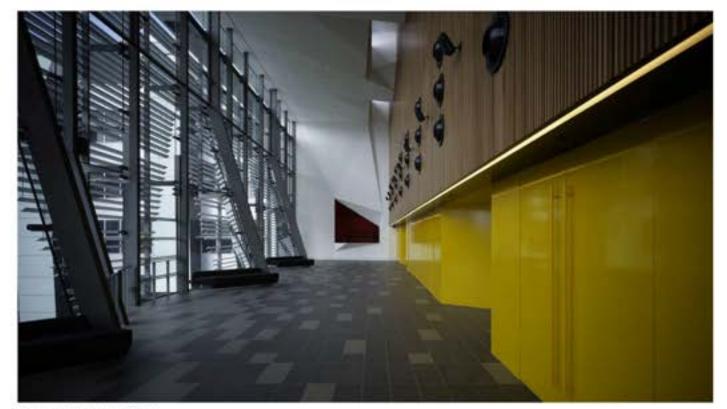
University of Western Sydney researchers are studying how higher atmospheric CO₂ concentrations and temperatures can affect native woodlands and ecosystems.

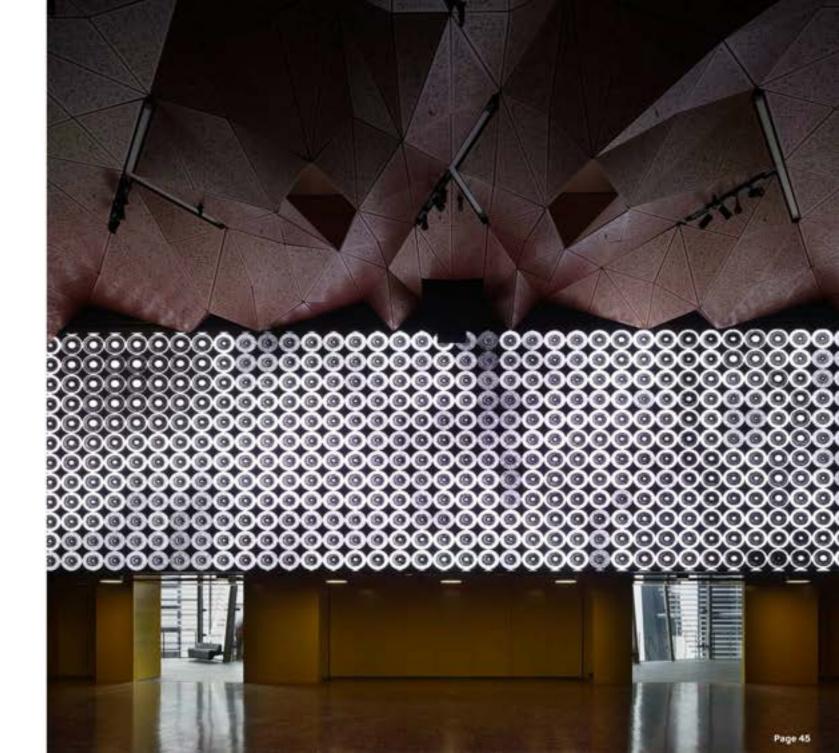
The EucFACE facility is the first experiment in the world to study a native forest. Designed with minimal impact on the ecosystem, a 'laboratory' of six arrays, supplies CO₂ at elevated levels, mimicking predicted future atmospheric concentration. The facility will host international researchers over the next decade, helping us understand and react to the effects of climate change, ahead of time.

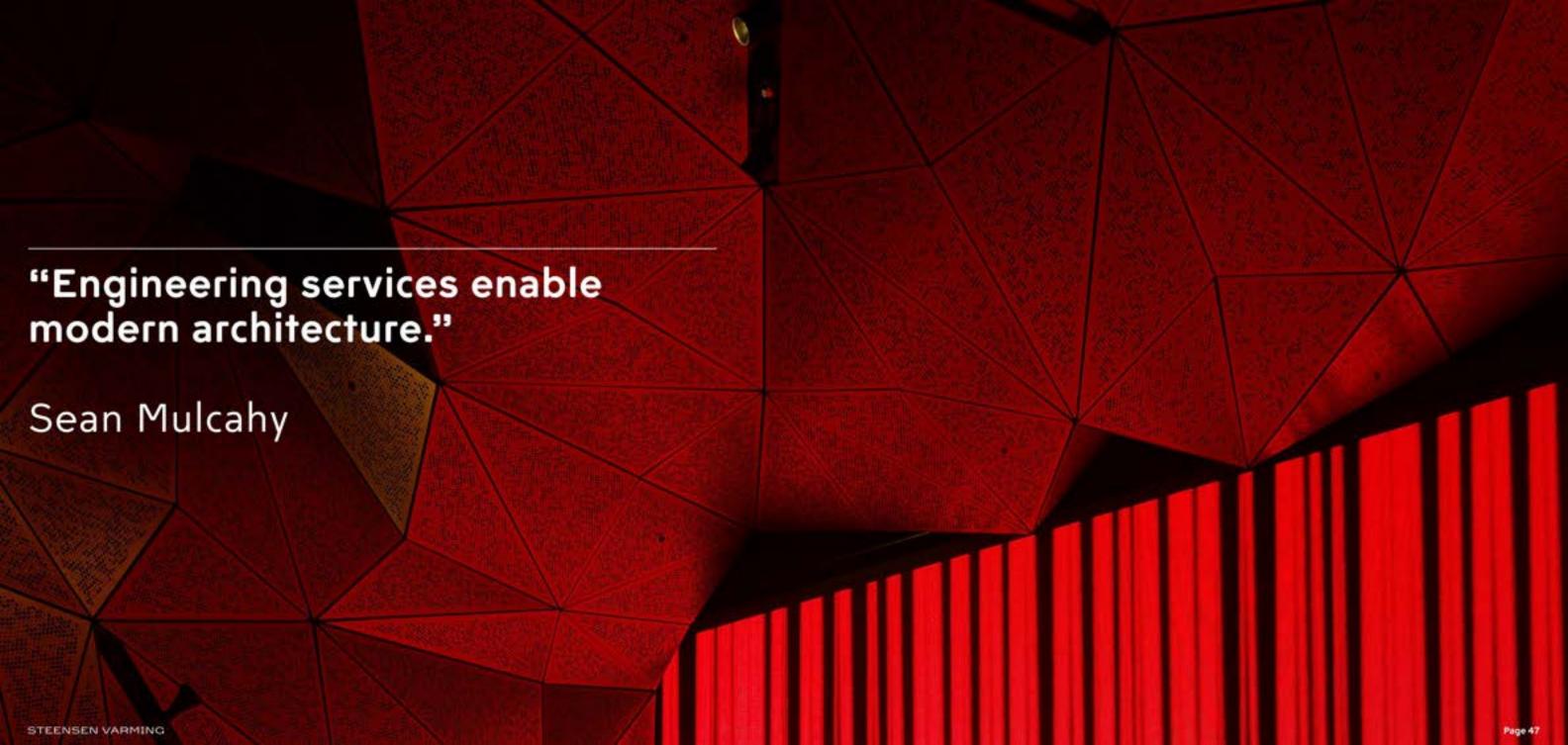
The faceted mantle integrates lighting, ventilation and acoustic attenuation into a singular, dramatic, metal surface, grafted onto the existing structure. The air-conditioning and distribution systems support multi-functional modes and a range of occupancy numbers.



Great Hall, University of Technology Sydney



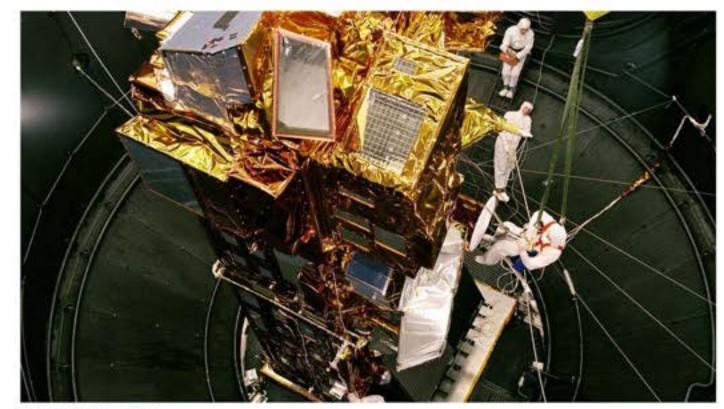




The Netherlands site is the largest of the European Space Agency's and the technical hub where the research and development for the majority of projects take place. These include science, exploration, telecommunications, human spaceflight, satellite navigation and Earth observation.

We were confronted with unusual requirements for laboratories that simulate launching and space conditions for rockets. Due to the technical complexity involved, we were employed as lead consultant.

European Space Research and Technology Centre Noordwijk







The human element

How can you design an art gallery if you don't appreciate art?



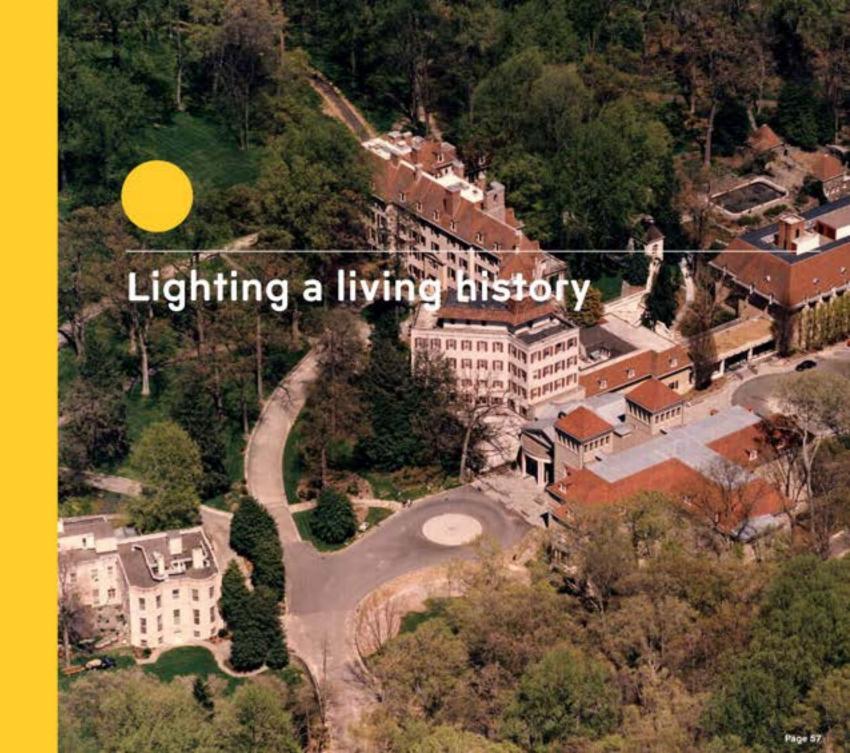
The lighting masterplan guides staged improvements encompassing over 100 buildings, monuments, landscape, vehicular and pedestrian connections.

This creates a coherent and harmoniously lit environment while reflecting the individual character of the spaces. An appreciation of darkness, light and shadow is key to the formation of focal points, facilitating orientation and way-finding.

Winterthur Museum, Garden and Library Delaware

Winterthur Museum, Garden and Library houses one of the world's most important collections of American Decorative Arts and a significant research library. Former home to the renowned collector and horticulturalist H.F. Du Pont, in the first half of the twentieth century, the museum today displays nearly 90,000 objects made or used in America from around 1640 to 1860.

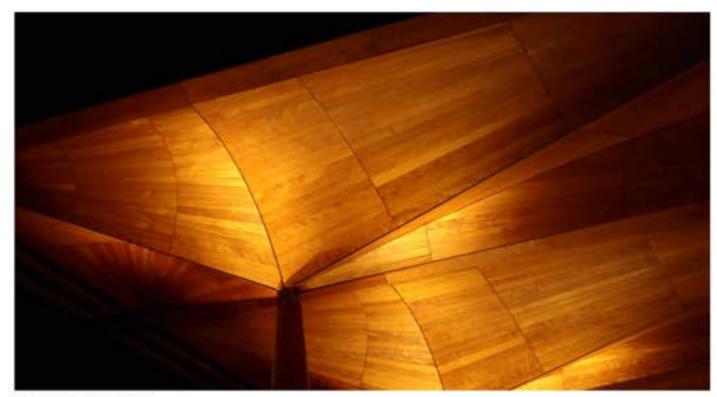
The 1,000-acre site itself is an important piece of cultural history, used extensively for conservation, research and education purposes. Steensen Varming developed a holistic master plan for exterior lighting to introduce sustainability and enhance the visitor experience of Winterthur at night.



Referencing the trees of the adjacent Albert Park, the Kauri canopy is the most distinctive feature of the gallery. The undulating soffit's 2000m² of precisely profiled, indigenous timber is sensitively uplit.

Light fittings of warm white, 3000K colour temperature with asymmetric forward distribution, beautifully and accurately render its light-honey colour, consistency and distinctive silvery speckled fuster.

Auckland Art Gallery







Herlev Hospital is the largest building in Denmark to date. Its 25-storey ward block is connected to its treatment block and distribution centre by a fully automated vertical transport system carrying 250 beds a day as well as books, medical samples and records.

"Polychrome Hospital" is also the country's largest site-specific artwork. Artist Poul Gernes coloured every surface, handle and door frame for the 150,000m² composition.

The scheme appears random and confusing until order prevails in the treatment tower where the constructive colour properties and placement engender positivity in the patients, contributing to a sense of wellbeing and recovery.

Herlev Hospital Copenhagen



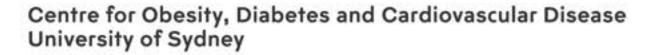




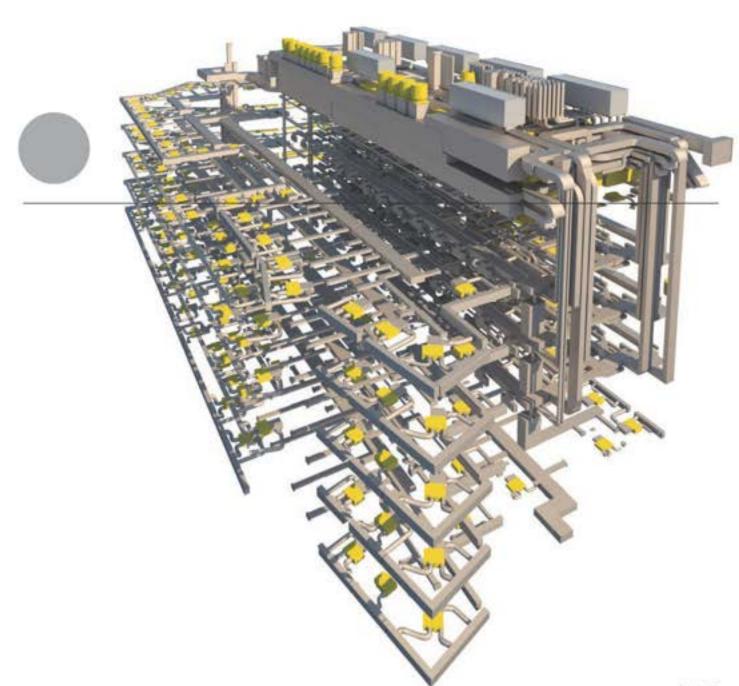
Page 63

The new building occupies 10% of the floorarea of the campus and is the largest project undertaken by the university to date.

An innovative laboratory lighting system, daylighting, low-energy ventilation systems and a multifunctional façade further enhance the 'thinking' environment.



This building was designed to support collaboration and new ways of thinking in research into obesity, diabetes and cardiovascular disease. Steensen Varming facilitated this aim with several initiatives including the development of a bespoke environmental rating tool and full documentation of building services in BIM.



STEENSEN VARMING



The centre's sustainable initiatives include geothermal cooling and innovative air tempering and filtering systems. Outside air passes through roof openings, geothermal water coils and the biofilter before further tempering in a thermal labyrinth below ground. The resultant indoor air quality is exceptional.

The hybrid ventilation openings bypass the active systems when external conditions permit, saving energy. A 4.725kW photovoltaic array also masks and shades the rooftop plant.

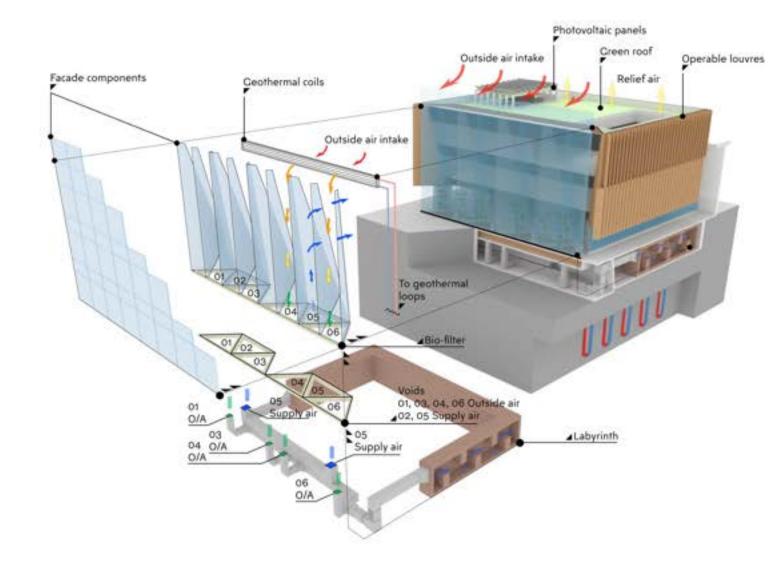
Surry Hills Community Centre Sydney

The Surry Hills Community Centre sits on a busy street in Sydney and is one of the most environmentally progressive buildings in the city. Steensen Varming developed the mechanical, electrical, sustainable and lighting designs. The building, by Francis-Jones Morehen Thorp, houses a two-storey library, community centre and childcare facilities.

Additional sustainable design initiatives were introduced throughout the project around energy reduction, water conservation, material selection, waste management and improvement of the indoor environment. The most remarkable initiative, and visibly sustainable statement, is the planted atrium that acts as a living biofilter, improving the air quality to the children's play area.

"We put a lot of energy into reducing energy."

Ralph Stedman



STEENSEN VARMING Page 66

My Own Worst Enemy

John Tonkin's work navigates his own ageing skin to a soundtrack of the Apollo missions.

The video animates our workplace. We see at close quarters the key surface that responds to the environments we create. We appreciate the parallels between physiology, the study of function in living systems, and the active systems we construct to give life to buildings. Skin, the original haptic surface, is the body's intelligent façade.

Intelligent design



Space heating is by way of in-slab heating coils and in the college rooms, recessed convectors integrated into the façade. Two years before completion, at the request of the Bursar, we estimated the cost of heating the new college at £6000 per annum, and the estimate is still accurate today. 50 years on, we advised the college on the sensitive integration of high-performance glazing.

The buildings were awarded a Grade I listing in 1993.

St Catherine's College Oxford University

In St Catherine's College, the building he called his favourite, Arne Jacobsen merged the new with the old to create a striking modern identity for a forward-looking college. His all-encompassing design included furniture, lampshades, cutlery, gardens - even the species of fish for the pond.

Steensen Varming had already worked with the Danish architect for more than two decades and shared his desire for elegant functionality and the value of holistic architecture. The mechanical services for the modern glass and concrete college buildings were meticulously detailed, enabling him to realise a bold vision.







When competing for the contract to design a new city half for Aarhus in Denmark, Arne Jacobsen didn't hold back in a call to Jergen Varming, "There's an ENGINEER on the jury, and you must GUARANTEE that we get his vote!" Jacobsen said.

Arne Jacobsen was awarded the contract and we provided civil, structural and mechanical building services for the classic functionalist work.



Aarhus City Hall





Identification of services is key to the aesthetic of this brutalist landmark and symbolic of their importance. Colour coding highlights the integration of fittings and mechanical services, introducing a human and playful contrast to the stark functionality.

The institute houses the Faculty of Health Sciences and Dental School for which we also delivered building services for a later extension.

Panum Institute University of Copenhagen







The Opera House attracts 7.4 million visitors a year, contributes more than \$1 billion to the Australian economy and supports more than 12,000 jobs. The innovative mechanical and hydraulic systems include air conditioning that utilises the harbour water as a heat sink.

The reversible heat pump supplies as to 120 fans distributed at 270m²/s through 35km of ducts to 3000 outlets.

1973

The Sydney Opera House

Sydney Opera House brought Steensen Varming to Australia and we have been involved in its systems design and maintenance since. The original air-conditioning solution best illustrates our commitment to aesthetic integrity, developed with Danish architect Jørn Utzon and later Hall, Todd and Littlemore. By utilising Sydney Harbour's plentiful water to provide cool air, we enabled the iconic silhouette to remain unit-free - a groundbreaking initiative on a world scale and the largest system of its kind.

The new lighting masterplan, developed in collaboration with Johnson Pilton Walker and endorsed by Utzon, ensures the Opera House is perceived as intended, not only enhancing the building and its public areas, but also the working environment.

"When you build a building like the Sydney Opera House, it is like an oil painting by one of the masters where every time you add a brush stroke, it should enhance the painting." Jern Utzon 2013 STEENSEN VARMING Page 89



Beauty in technological advancement

It took eight years to build the shells of the Opera House and three years to develop the ceramic cladding. The shells were illuminated at night by just four 1000W lamps on each side.

In accordance with the masterplan, the shell lighting now renders the ceramic tiles in their neutral tone, with multiple 150W sources orientated to model the full beauty and curvature of the building's geometry.



Value in relationships

"Any new thought deserves the benefit of being turned over with the fullest enthusiasm."

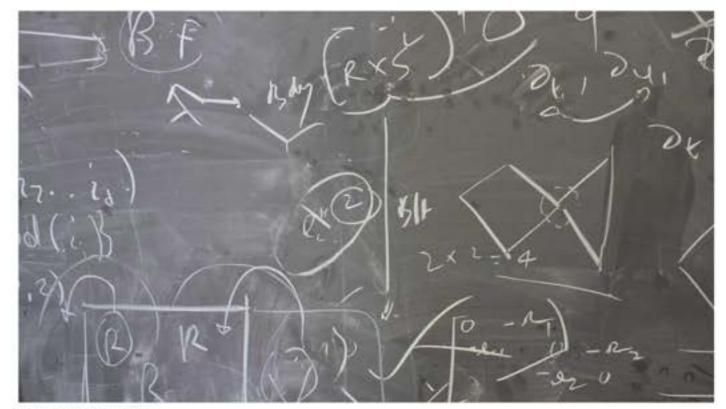
Niels Bohr

"We were fortunate to have worked with Professor Niels Bohr right from the start in 1933. It was an acquaintance which directly and indirectly was to become of the greatest importance to the development of our practice..."

Jergen Varming

The dynamic research at the Niels Bohr Institute spans Astronomy, Ceophysics, Nanophysics, Particle Physics, Quantum Physics and Biophysics.

Niels Bohr Institute Copenhagen









We designed the innovative bookshelves, which support the entire book tower - an interesting concept given the diminishing role of physical books in society today.

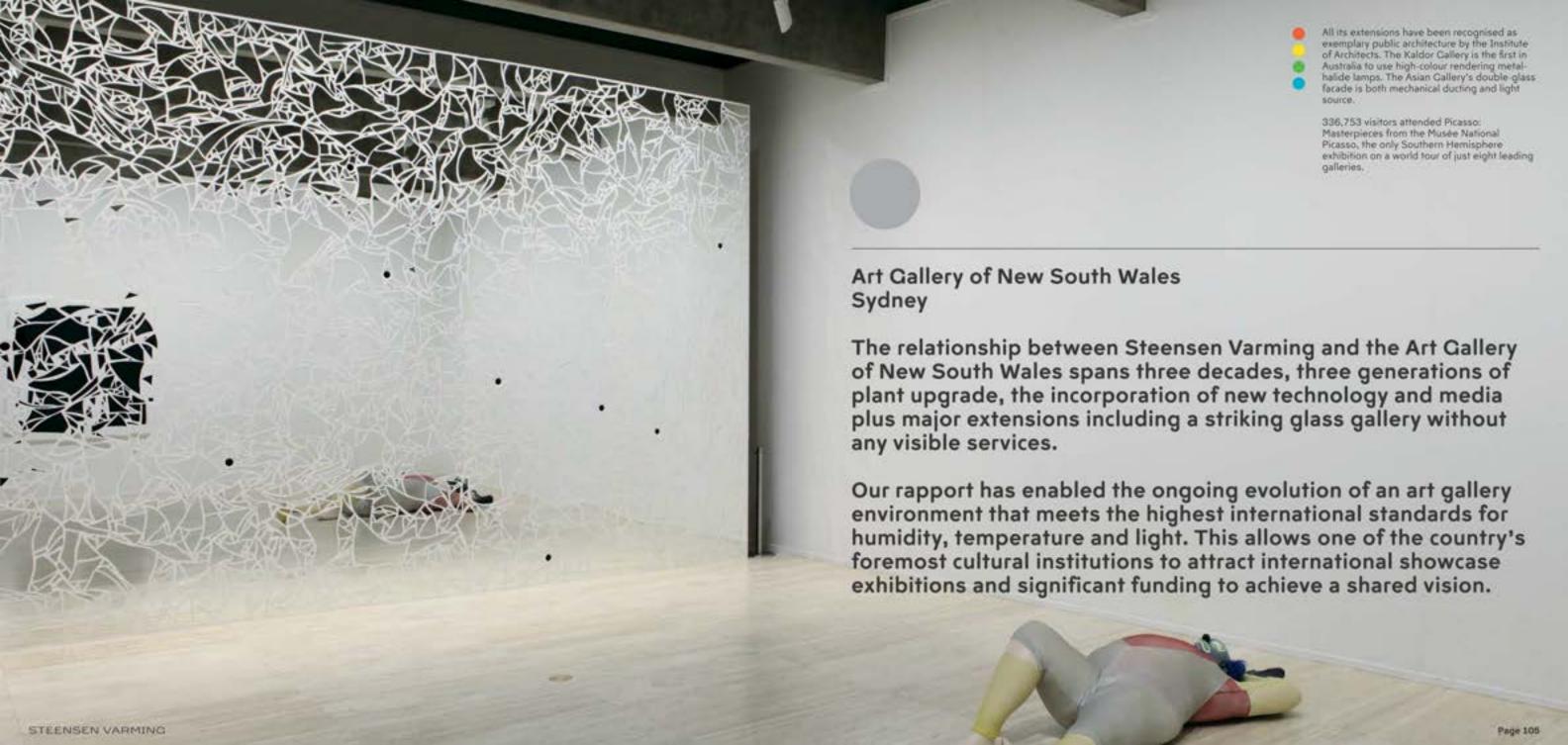




"The frequent association – and even rare combat – with clients and architects is the greatest source of inspiration to our profession."

Jørgen Varming



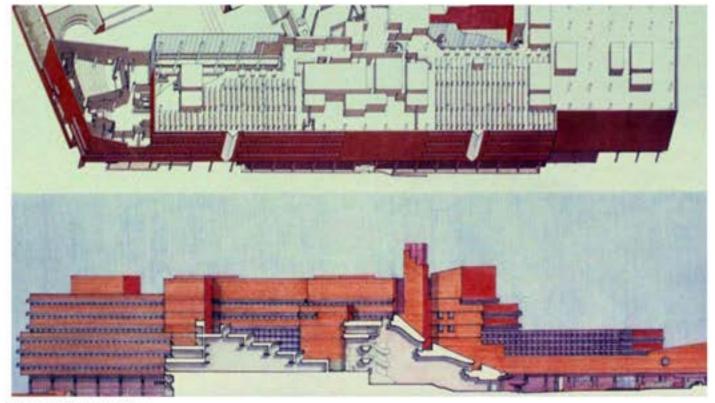


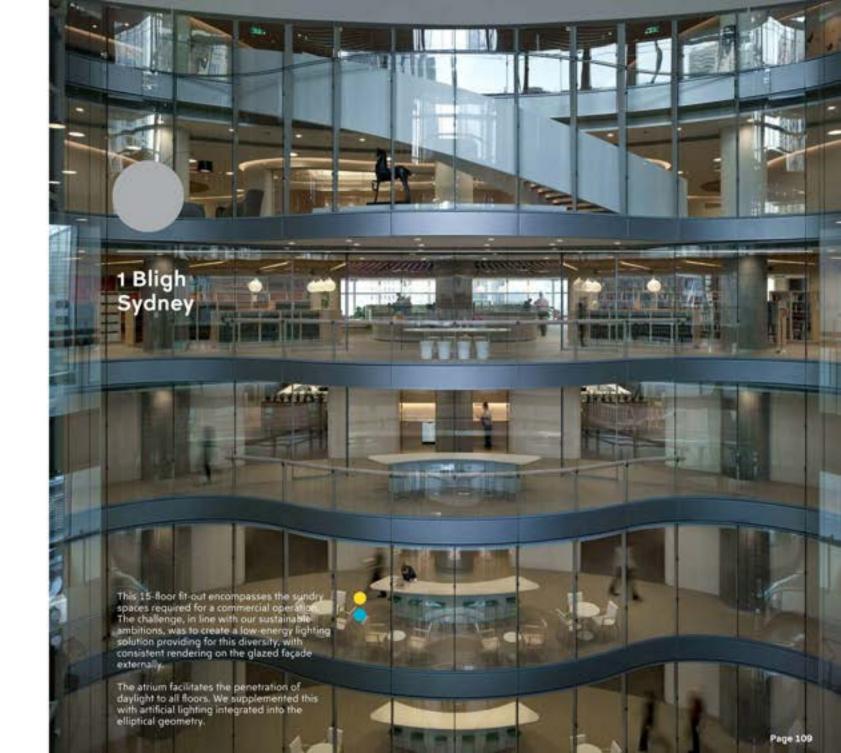


The largest public building constructed in the U.K. during the twentieth century, the British Library took 23 years to complete and houses some 150 million items.

Collaboration was an important design agenda from the start and our engineering services included the world's first automatic book retrieval system. Along with The Mint, the building was listed as one of the top 30 groundbreaking buildings in the world by the Chartered Institution of Building Services Engineers.

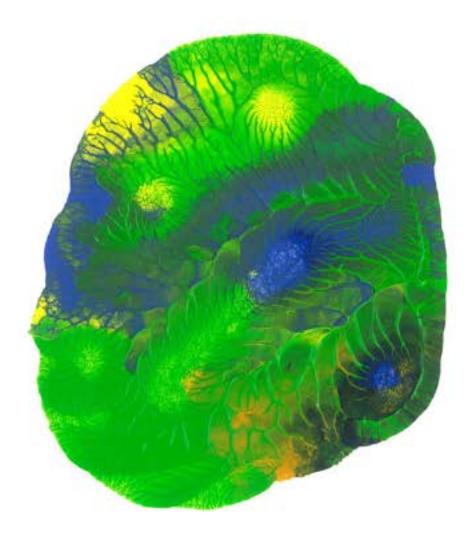
The British Library London

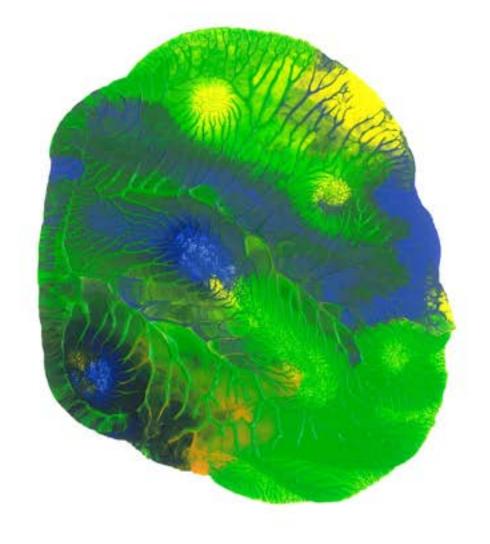




Like Jergen Varming, our past director Sean Mulcahy has a love of art and music. In his studio he creates physical representations of music in paint, the artwork representing a chord, each colour a note with the resonance revealing itself where the chords unite.

Mulcahy's use of rapid, free-hand, disposable communication within the design team, promoted effective collaboration and has had a lasting influence on the working methods of the practice.





Gravitas

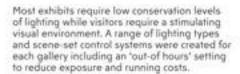




Glory in the air



Described as the finest collection of manuscripts and books by a private collector in the twentieth century, the library's treasure of artistic, religious and secular works date from 2700 BC. The Islamic Collection alone has more than 260 complete and fragmentary Qur'ans from the late eighth and ninth centuries.



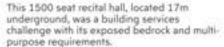
Chester Beatty Library Dublin





purpose requirements.

The hammered apsidal wall is uplit to create a dramatic focal point. Employing the natural qualities of the Sydney sandstone, our low noise, low energy systems maximise the thermal capacity of the rock while maintaining the acoustic quality of the space.

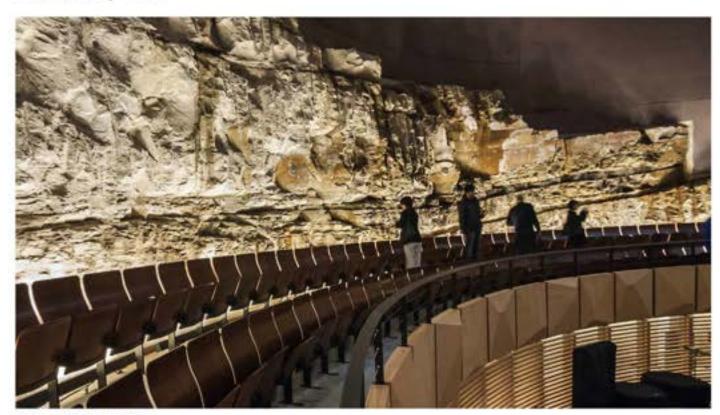




Collaboration with Basil Spence on Coventry Cathedral took our practice to London. Rebuilt after a bombing raid in 1940, Spence's design preserved the ruins and united old and new parts of the church with a garden of remembrance.

With its integration of services and collaborative teamwork, the project brought Scandinavian approaches to the U.K. including an unobtrusive underfloor heating system, providing radiant warmth in the capacious

Sydney Grammar School Assembly Hall

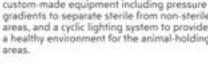


St Michael's Cathedral Coventry



STEENSEN VARMING Page 121 In a relationship with the hospital spanning 15 years, we have undertaken complete services masterplanning, maintenance and major capital projects.

The Biocore, a state-of-the-art isolation laboratory for essential cardiac research, required the design of sealed services and custom-made equipment including pressure gradients to separate sterile from non-sterile areas, and a cyclic lighting system to provide a healthy environment for the animal-holding areas.



St Vincent's Hospital Sydney







The Australian War Memorial is one of the country's most significant locations. Its individual memorials include The Eternal Flame, a sculptural feature of the Pool of Reflection, burning as a perpetual reminder of the service and sacrifice of more than 100,000 Australians

Such a sensitive site requires subtle solutions, with minimal disruption, for the replacement and provision of services that preserve and enhance the memorial and its surroundings.

"Here is their spirit, in the heart of the land they loved; and here we guard the record which they themselves made."

Charles Bean

Australian War Memorial Canberra



STEENSEN VARMING Page 127 "When the last claustrophobic bonds of the war were broken, we were seized by an immense urge to get out and take part in no less than the reconstruction of Europe."

Jergen Varming

Thinking without borders

Steensen Varming was founded by Niels Steensen and Jørgen Varming in Copenhagen - but the seeds of a global outlook were already sown when Jørgen and his architect father before him, studied in the U.K. Not long after the war ended, the Dublin office opened followed by Edinburgh and London - all preceded by prestigious commissions with competition-winning architects. The Sydney Opera House commission with Jørn Utzon continued this pattern and the Sydney practice opened in 1973. Hong Kong and New York followed in our eightieth year.

We developed through working with Arne Jacobsen, Basil Spence, James Stirling, and other masters of twentieth century architecture, none of whom let geographies restrict their horizons. We remain inspired by our Danish heritage while working with visionary architects and clients, wherever their location. Being global means more than expansion or having a physical presence in different countries - it is a way of thinking.





Mechanical Engineering
 Lighting Design
 Sustainable Design
 Electrical Engineering

Design & typeface

For the anniversary of the company we created a redesign that builds on our Danish Modern heritage. The photographic simplicity and detailed typeface combine with the grid and colour system to create a sharp, simple and contemporary corporate identity.

The Steensen Varming custom fonts are an integral part of the rebrand - from the letters that appear in the logotype, to the text you are reading in the book you are holding - that ensure a distinct typographic identity and consistent company image. Design details such as 'chiselled corners' and the 'sharp bends' of the letterforms reference the detailed world of Steensen Varming and establish a unique look without compromising legibility, even in small point sizes.





A way of thinking

Published by Date

Steensen Varming 2013

Design Typeface Copywriting Editorial Communications Seren Varming, punktum design MDD Henrik Kubel, A2/SW/HK + A2-TYPE

Fiona Duff, Tactile Sara Best, Steensen Varming

Kristian Eiberg, Relations People

Christoffer Harlang

Architects

Title

Architect Preben Hansen, Architectus, Arne Jacobsen, Bates Smart, Bligh Voller Nield, Building Studio, Colin St John Wilson and Partners Architects, Daniel Beasly Architecture, Daryl Jackson Robyn Dyke Architects, DeManincor Russell Architecture Workshop, Eva & Nils Koppel, Francis-Jones Morehen Thorp, Francis Johnston, Cuymer Bailey Architects, Hall, Todd and Littlemore, Harry Seidler and Associates, Hassell, Ingenhoven Architects, Johnson Pilton Walker, Jern Utzon, Kann Finch Group, Kim Utzon Architects, Kristoffer Nyrop Varming, Max Brüel, Fehrdt Bornebusch & Jargen Selchau, PTW Architects, Sir Basil Spence, Woods

Bagot.

Artists Caroline Rothwell, Gerard Reinmuth, John Tonkin, Sean Mulcahy.

Images Aero Photo Ltd courtesy Winterthur, Andreas Wiking, Barry Tam, Brett Boardman,

Cavanagh Photography, Colin St. John Wilson and Partners Architects, Craig Spring, Daniel Hopkinson, ESA-A. Le Floc'h, Carry Luu, Isaac Leung, John Gollings, Michael Carver, Michael Yip, Photodisc, Pressefotograf Jens Morten, Richard Drew, Richard Clover Photography, Saverio Marfia Photography, Simm Steel, Seren Nielsen, The Trustees of Chester Beatty Library Dublin, Tyrone Branigan Photography.

Models H.F. Lambert Industrial Models, Porter Models, Sydney Opera House Trust

Varming Alliance SVM Partnership, Varming Consulting Engineers.

Printing Narayana Press ISBN 978-0-646-90733-8 Disclaimer

Every effort has been made to seek the correct permissions and copyright for

material reproduced in this book.

For the valuable contributions of our ambitious clients, inspirational collaborating Thank you

partners and dedicated staff.

"And by the way: Varmings never give up."

Seren Varming Grandson of Jergen Varming

steensenvarming.com