Making a Splash: 
Architectural Drama in Chinese Aquatic Theatres

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“Three Arts . . . Music, Architecture and Movement, together form the one great and perfect Religion in which we may see and hear all the Revelations of Truth.”
Edward Gordon Craig

The aquatic theatre revival, led by director Franco Dragone, combines theatre, circus, dance, and water displays to create lavish extravaganzas. Reminiscent of Edward Gordon Craig’s vision of theatre, presented in the portfolio of etchings entitled Motion, aquatic spectacles use the pool stage and its supporting technology to create a new type of kinetic performance space. Craig’s cubes are exchanged for colliding fountain columns and sprayed liquid surfaces of fine water droplets that, among other features, serve as Screens to reflect light and projections. Circus artists and gymnasts, suspended from the fly gallery and hung on safety ropes, perform highly stylised movements in the air above the stage and auditorium, like contemporary Über-marionettes. With up to six hundred stage cues per show, these spectacles come quite close to Craig’s idea of A Thousand Scenes in One Scene. No words are spoken; music alone accompanies the constant movements of the performers, the scenography, and the architecture. The wordless drama of aquatic theatres, especially in China, where limits are pushed to the edge, is, above all, architectural drama. Remembering Craig’s Scene, which stands for the beginning of the modern theatrical era, this paper examines today’s kinetic spaces in three Chinese aquatic theatres: The House of Dancing Waters (City of Dreams, Macau), The Han Show (The Han Show Theatre, Wuhan), and The Dai Show (The Dai Show Theatre, Xishuangbanna). It asks what it takes in practical terms to realise some of Craig’s ideas, and whether the stage
kinetics of aquatic theatres are capable of expressing “all the Revelations of Truth” – in a splash.

Aquatic theatres

a. The “House of Dancing Water” Theatre

A few months after Le Rêve opened at Wynn Las Vegas in May 2005 Lawrence Ho, Co-Chairman and CEO of Melco Crown Entertainment, invited Franco Dragone to create The House of Dancing Water, an aquatic show for the City of Dreams in Macau. The initial meetings with Patrice Bilodeau, director of production, took place in November 2005. An agreement was reached one year later, and project development finally began in early 2007. The theatre was envisioned as the main attraction in the City of Dreams, an upscale resort that includes the Grand Hyatt hotel, casino areas, retailers, and restaurants. It was constructed as a permanent facility and an inseparable part of the building complex. Drawing upon his experience designing Le Rêve, Michel Crête devised The House of Dancing Water show and the theatre together with Pei Architects. A circus tent served as the starting reference for a theatre in the round, with 2,000 audience seats enabling close proximity to the action in the pool.

The House of Dancing Water. Sourced by The House of Dancing Water.
The House of Dancing Water opened in September 2010 and was the first aquatic spectacle to be introduced to the Asian market. The show combines theatre, dance, circus acrobatics, motocross stunts, and high dives, with large-scale aquatic effects. Unlike aquatic shows at United Stages such as O, the now classic aquatic show of the Cirque du Soleil at the Bellagio and Le Rêve at Wynn in Las Vegas, this production has a clear structured narrative: a tale of the forbidden love between the Stranger, a sailor who survives a shipwreck off the coast of Coloane, and the Heroine, a beautiful Princess imprisoned by her evil stepmother, the Dark Queen, The House of Dancing Water also tells a broader story of the encounter between Europe and Asia and the exchange between these two cultures. The combination of Eastern circus artistry and Western theatre references is enhanced by the extent to which the performance space is automated. Large pieces of scenography, including ship masts, a traditional Chinese pagoda, and a footbridge, emerge out of the pool stage and, when the scene is finished, return below the water’s surface. With 274 automated fountains that shoot beams of water up to 18 metres in the air, the show has set new standards in aquatic entertainment. Using different forms, textures, and colours, this powerful fountain system transforms the void above the stage with countless spatial options, and sets different moods to express the main characters’ emotional journey. Colliding water columns create splashes, which are then used as liquid screens to present different qualities of projected images and light. Eight jumping jets are incorporated into the third row of the auditorium, throwing water from the audience’s seating area onto the stage. To allow them to experience the thrill but still avoid getting completely wet, the audience members occupying the first few rows are given rain ponchos and towels.

In order to illustrate what it takes to use huge amounts of water as scenography, and to use a kinetic stage to move it liberally around a performance space on this scale, I will give some technical details regarding the theatre infrastructure, which was developed in collaboration with Theatre Projects Consultants. Of the eleven floors of the theatre building, four underground levels store the elaborate machinery required for the stage lifts and the pool stage. This supporting infrastructure includes water pumps, air conditioning, air compressors, an air distribution system, a filtration system, electric installations for the fountain system, stage-lift mechanics, and the additional holding tank used to store the water while the pool’s filters are cleaned. The pool shell of the central stage, which contains
17 million litres of water, is 8 metres deep. The shell is a sealed concrete wall (approximately 1.2 metres thick) painted with elastomeric coating, a water-tower paint, to make it dark. The wet-stage segments have a vertical trajectory of 7.5 metres in total, with a maximum height of 1 metre above the water’s surface, and their lowest point 6.5 metres underneath it. The quick transformation of the stage by means of 11 movable segments, for example, requires five hydraulic pumps. Two additional pumps are always available as backup in case of a malfunction. The surfaces of the stage platforms are perforated with 20-millimetre holes in order to facilitate their movement through the pool and to reduce water pressure. It is the same system as that developed for O, but on a much bigger scale: the pool itself contains more than three times the amount of water than the tank in Le Rêve. The pool’s 21-metre visible diameter extends below the audience’s seats to 50 metres in total, an area used by divers, technicians, and performers to enter and exit the water, as well to store the scenography. To make its surface glitter, and mask the action below, air pressure is inducted into the water. In addition to their visual effect, the resulting bubbles also have a practical one: softening the pool’s surface, they reduce the physical impact of the landing for dives from the 24.5-metre-high platform. Because the bubbles reduce visibility, however, the performers need to be guided into and out of the pool. There are 20 diving technicians in the pool during each performance who are responsible for the show’s operation, including positioning the underwater scenography, ensuring the performers’ safety, distributing air-lines (breathing apparatuses), and maintaining the pool stage.

Temperature is an important issue for aquatic theatres because the performers are wet throughout the show, and notice the slightest change both in and out of the water. This is heated by a grill construction, which is positioned underneath the auditorium in order to keep the temperature stable. Anna Robb, the general stage manager, explains: “The water is kept at 30 degrees. Even if it even drops half a degree, it can have an impact. Drastic changes in temperature can lead to more people becoming sick, and more performers and divers being restricted from going underwater”. Monitors installed in the pool help diving technicians see, and speakers help them hear what is happening above the surface, so they can coordinate the action in the water with the action onstage. Additionally, the communication system integrated into each team leader’s diving suit enables direct contact with the aquatic-stage manager. Regarding the pool stage, all movements
are precisely coordinated, and high dives are supervised every step of the way to ensure maximum safety for the performers and the crew. Robb points out the importance of having such measures in place: “Performers have a very strict protocol that they need to learn and adhere to when entering the Aquatic environment. They are also trained extensively and at their own pace until they feel comfortable doing what is asked of them. No technician goes in the water without it being communicated, and like normal dive practices, must go in with a dive partner. No artist goes underwater without diver supervision. On deck, no lift move is executed without full communication with Aquatics and those involved onstage”.

The construction phase brought Bilodeau’s team many challenges. One of these was building the pool shell and the additional holding tank necessary for regular water filtration. In the solution used for O, the water drained from the pool goes into an artificial lake situated between the Bellagio resort and the Las Vegas Strip. In The House of Dancing Water Theatre, meanwhile, a holding tank was built below the pool stage. This option yields a shorter drainage path, and allows the whole procedure to be more time-efficient. Draining, filtering, heating, and refilling the pool shell takes at least a day in the O theatre, but, with the tank underneath the main stage, this time has been reduced to a couple of hours. To accommodate the pool, stage machinery, and holding tank, an almost 30-metre-deep trench had to be dug on the small island of Taipa (and Coloane), an area covering approximately 15 square kilometres. This engineering feat was accomplished with a slurry wall, a reinforced concrete wall used in areas with soft earth close to open water that reached the bedrock of the building site. Excavation accounted for some of the highest entries in the project budget. Because of further complications, the construction was delayed twice. At the end of 2008, the financial crisis interrupted cash flow, and forced the team to slow its progress for a while. Then, in October 2009, technical problems meant the show’s opening had to be postponed for a second time. Due to the construction crew’s lack of experience in building theatres of this kind, shortcuts were taken and mistakes made. These included miscalculating the size of the drain around the pool, which resulted in the theatre floor being flooded when the stage lifts were tested. The cheap, second-hand pipes used for the plumbing for the water-filtration system caused an explosion, leading to further delays, additional costs, and some changes in management. Eventually, Bilodeau merged the management teams from Melco Crown Entertainment and the Dragone
Company into one unified team for *The House of Dancing Water*, which increased efficiency and savings, and finally finished the theatre in May 2010, when rehearsals began.

The show’s technical team comprises 134 members in total, including divers, heads of department, and a day crew. Working hours are divided between the crew responsible for maintenance, and the one charged with running the show. Each performance requires 86 staff members backstage. The technical hub contains 11 control stations for lighting, projection, special effects (the fountain jets), stage management, aquatics (dive control), rigging, automation, and sound. The pool has its own communication, video, and sound system. As described by Light and Sound International: “The system is composed of 16 Splash-Cam underwater video cameras and four Shark Marine cameras attached to the divers’ helmets, as well as 36 Lubell Labs LL916 underwater loudspeakers. The diver cameras link to a CCTV system installed throughout the theatre and to a direct controllable Honeywell video system at the Aquatic show call console position”. The theatre infrastructure is inspected daily to ensure a flawless delivery by both the show and the facility itself. However, the high level of technology involved in the infrastructure does not need to be monitored 24 hours a day. The overnight security personnel check some of the systems, such as the water filtration, as part of their usual routine.

b. The “Han Show” Theatre

The Han Show Theatre was envisioned as part of the larger urban development of the central cultural district in Wuchang, a downtown area of Wuhan, between the East Lake and Shahu Lake. This “mixed-use cultural tourism project” was developed and funded by the Dalian Wanda Group, a leading property-development corporation in Asia. The project included extending the Han Street to home retailers, restaurants, and entertainment venues, three luxurious hotels, an indoor theme park, and an aquatic theatre for *The Han Show*. Marc Fisher, of the Stufish Entertainment Architects Studio, was commissioned to design The Han Show Theatre (and the Wanda Movie Park), and he created an iconic building in the shape of the traditional Chinese red lantern. Unlike its counterparts in Macau and Las Vegas, this aquatic theatre was designed as a freestanding building rather than as an integral part of a larger complex encompassing resort, entertainment, and casino areas.
The Han Show Theatre, which took two years to build, opened in December 2014. Its architecture emerged from the conceptual idea for the show combined with a consideration of the functional, organisational, and aesthetic demands of the pool stage. The building consists of 11 floors in total. Four underground levels host the pool-stage technology, filtration systems, air conditioning, air compressors, stage mechanics and hydraulics, as well as the additional holding tank for water drained from the pool during the filtration process. The ground floor is reserved for the theatre and its auditorium, around which curl circular storage corridors, quick-change areas, a performers’ lounge, offices, a lobby, and a retail shop. The remaining administrative, management, and technical areas are spread across eight floors above ground and include offices, wardrobes, workshops, and a vast fly gallery with rigging equipment, control units, and platforms for aerial acts and high dives. The pool stage, 1,200 metres square, 8.7 metres deep, and filled with 10 million litres of water, is hidden beneath the auditorium seats. The theatre proscenium disposition is comprised of a 44-metre-wide main stage, which, together with the pool-stage area, contains 16 stage lifts and 2,000 variable geometry seats. Rearranging the audience galleries in mid-show (two audience segments separate sideways and one descends vertically) reveals the pool stage: the space changes into a trust configuration with the pool in the middle. Changing the seating arrangement opens a 270-degree-wide-angle viewing experience. The Theatre Projects Consultants Company provided services regarding the theatre planning, the
auditorium and geometry, the stage-design concepts, the design and specification of the theatre equipment, and the infrastructure.17

In addition to the pool stage itself, the aquatic theatre is equipped with 230 fountain shooters positioned along the apron of the main stage, both in and around the pool. They catapult water beams up to 16 metres in the air. Meanwhile, “rain” falls from the approximately 26-metre-high grid into the pool, creating a waterfall effect, a huge liquid “curtain” (ca. 700 square metres) between the pool and the main stage. Rain ponchos and towels are provided for the audience sitting in the first few rows. The main attractions, however, are three gigantic robotic arms (ca. 30 metres high) on the main stage. Each holds a 10-metre-wide LED screen, which covers an area of 75 square metres and weighs eight metric tonnes.18 These robotic arms are designed to facilitate moving the LED screens up to 28 metres across the stage. To ensure precision of movement and avoid collisions, Siemens AG, one of the companies responsible for the robots’ development and installation, used a control system that coordinates “six joints, 12 motors, and 14 axles on each robot — for a total of 42 axles”.19 This multi-axle control system uses the SIMOTION D435 motion controller and the SINAMICS S120 drive system that are commonly used in the industry (ibid).

As reported in the article “Siemens Takes to the Stage”, the robots are similar to those used in the automobile industry to weld metal sheets. Even though their trajectory towards the audience’s seating area is limited to their vertical axes, they are able to move the screens in almost every direction.20 Apart from delivering the technology for the robotic arms, Siemens AG has also provided diverse components for the building’s low-voltage supply system, programmable logic controls for the safety of the performers and the audience, and a building-control system and its Profinet21 data-transmission infrastructure.22 The constant reconfiguration of the wet-stage lifts, which changes the size and depth of the pool, combined with risky high dives and aerial acrobatics, demands strict control and safety measures. Ten cameras follow everything happening onstage. The supporting mechanical system is equipped with an alternative backup infrastructure (command consoles, monitors, motors) that stands ready should any part of the stage technology malfunction. To ensure the safety of the 30 performers who enter and exit the pool during the show, 10 diving technicians coordinate the action in the water. They catch performers after landing, provide them with air-lines (breathing apparatuses) and guide them in and out of the pool. To communicate with the stage manager, who gives the
cues, the divers have an intercom system installed in their diving suits, and can hear well underwater. As Moe Defendi, technical director of operations and head of the aquatic department, explains: “It’s a military system from OTS – Ocean Technology Systems in USA. Connected to a main board with 16 underwater cameras. We also have 12 Lubbel Lab underwater speakers from USA, they broadcast divers’ commands, board operator commands and show music, as well as any emergencies or changes”. Fresh water is needed on an almost daily basis for the pool’s regular water filtration. In the case of The Han Show, the water in the pool is filtered every 36 hours, exchanging 1,200 litres of water as part of the Backwash filtration system. It is a similar system to the one used in lakes and public pools, with the main difference connected to the water temperature. At 31°C, water vaporises a lot of chemicals whose amounts need to be increased regularly. Every 36 hours, the water in the pool is pumped into a holding tank in order to enable the filters to be cleaned.

All the technical details mentioned above give an insight into the complexity of the mechanical and technological infrastructure needed to articulate the show’s plot through extravagantly visual, kinaesthetic, and, at least for some audience members, also tactile experience of water displays, the circus, and theatre arts. The narrative follows a young couple’s journey into an imaginary kingdom. While attending a ceremony of the scroll of wisdom, they are separated by the evil Golden Faced Leader and forced to embark upon an adventurous journey. Before they can be reunited, they go through a variety of challenges imposed on them by the kingdom’s inhabitants. Depicting references to Chinese history throughout the show, the aquatic spectacle pays homage to the long and rich cultural heritage of the Hubei province, but at the same time showcases the latest technology that stands for modern-day China. During the show’s 90 minutes, the ensemble cast of 95 artists demonstrates a wide range of skills, including trapeze and Russian-swing acts, high dives, aerial acrobatics, and scooter and fly-board stunts. Departing from their origins in the United States, such as in O at the Bellagio and Le Rêve at Wynn Las Vegas, circus acts in The Han Show are incorporated into the dramaturgical structure of the simple story that follows the young couple’s adventures.

As did The House of Dancing Water, The Han Show Theatre has had to face a few challenges. The construction phase, for example, suffered delays due to an inexperienced crew unfamiliar with this type of building. A technical team of experts in the field was imported from Europe and the
United States and trained local technicians in different tasks so the Chinese team could gradually take over the responsibilities of controlling, operating, and maintaining the technology and infrastructure. One and a half years after the show’s premiere, only a few foreign technicians and team leaders were still involved in the project. The show was rehearsed in a rented recreational facility, before moving onto the stage of The Han Show Theatre. The team thus had just three months to adjust to the space before opening and had also to contend with altering the show’s ending, as it failed to meet the investors’ expectations. The Han Show has a 10-year contract with its investors and the city. Perhaps surprisingly, the show was not as successful during its first two years as The House of Dancing Water, with an average to good number of visitors. Renting out the theatre for promotions and presentations in a package with the show has proven to be a good management strategy to increase ticket sales and stay profitable.

c. The “Dai Show” Theatre27

The Dai Show Theatre is part of a larger tourism project financed by the Dalian Wanda Group in Jinghong, Xishuangbanna Dai prefecture, in the Yunnan province of South China. According to the company’s website, this 15-billion-yuan investment covers 5.3 square kilometres of the Xishuangbanna International Resort, and hosts an outdoor theme park, a six-star hotel, two four-star hotels, the Wanda Plaza commercial centre and lakeside bar street, a hospital, and, of course, The Dai Show Theatre.28 This ambitious project is divided into five sections: the Butterfly Kingdom, the Jungle Adventure, the Ancient Tea Horse Road, the Fisherman’s Wharf, and the Water Park.29 Apart from The Dai Show, it features additional popular entertainment events such as “the ice musical ‘Princess Butterfly’, the carnival parade ‘Princess Peacock’, and the water stunt show ‘The Mermaid’. 30
The Dai Show Theatre, one of the resort’s highlights, opened in September 2015. Following the main theme of the project, which was influenced by the subtropical nature of the region, Maciej Woroniecki and Alicia Tkacz (Stufish Entertainment Architects) designed both the theatre and the scenography for the show. The development process started in January 2014 and comprised a series of preliminary conceptual designs that revolved around frame parameters concerning the capacity of the pool stage, the seating layout, and the 3D-flyingroutes for the performers. 31 Once the client had accepted the proposal for the theatre in June 2014, the concept was further developed to include refining the façade and its structure in an attempt to bring the organic character of the surroundings into the construction. Accordingly, a circular rooftop 110 metres in diameter, the building’s dominant architectural element, was “inspired by the geometry of the palm frond”. 32 Woroniecki states the efforts to use the climate’s frequent breeze by incorporating openings into the gap between the lower and upper portions of the roof, providing natural ventilation and so, as far as possible, reducing the energy needed for the building’s air-conditioning. 33 The Dai Show Theatre is smaller in size than the other examples we have discussed thus far. Development was constrained not only by a tight budget but also by the position of the site on an aeroplane path, which restricted building height to 21 metres. Another concern was the client’s wish to economise on excavation costs, which determined the depth of the central pool stage. These parameters all influenced the conceptual decision to organise most of theatre’s structure at the ground-floor level and to add an
annex building. The ground floor houses an external public lobby, retail shops, the box office, a VIP area, offices, dressing rooms, the pool stage, the dry stage, the auditorium, and a scenography workshop. The annex, which is connected to the main building on its western side, contains the canteen, a physiotherapy facility, a green room, and a dance studio. The building has two basement floors beneath the stage at -9 metres and -5 metres. The audience enters the auditorium at the 4.5-metre level. Additionally, one circular catwalk 9 metres above the stage has a musicians’ platform and 10 gates for the performers’ 3D-flying routines. Another circular upper-grid catwalk at 15 metres is used for hanging light, sound, and projection equipment. These two circular runways are connected by four bridges.

The performance space is three quarters in the round with a 1,183-seat auditorium. The pool shell is filled with 300,000 litres of water. On one side, the central pool stage is extended into a trapezoid wet stage, and connected to the circular segment of the 55-metre-wide dry upstage area behind it. Altogether, it covers 1,400 square metres. The upstage area, as explained by Tkacz, serves mostly as an entrance for the performance and the scenery. The central wet stage spans 14 metres. It is divided into a shallow pool area, which is 0.3 metres deep and 8 metres wide, and a 5.5-metre-deep pool in the middle, which is used for a 15-metre high dive. Four 200-HP pumps can transform the wet stage into a dry surface in 20 seconds. The holding tank for filtering the water is positioned at the side of the pool pit. The pool basin can be emptied in 3 minutes and refilled in 7 minutes. Seventy-four powerful water jets are incorporated not only into the central stage, but also into the auditorium and the upper gallery. They create a variety of displays, shooting water high above the audience and from between their seats. From the gallery above the upstage proscenium, three falling rain showers create 9-metre-high “liquid screens” that divide the wet and dry parts of the vast stage. As in the shows described above, rain ponchos are provided for the first rows of the audience. The show’s water effects, such as jumping jets, an indoor rain shower, and “the physical appearance of an infinity pool edge adjacent to the dive pool basin” have been designed and developed by the theatre consulting company Auerbach Pollock Friedlander and the STO Design Group. An automation system with controls and winches, provided by Wagner Biro, enables aerial acrobatics. It includes “13 acrobatic hoists (typical capacity 250 kilos) and two multiline scenic hoists, each with a capacity of 1,000kg”.
The Dai Show is the third aquatic spectacle realised in China by Franco Dragone and his team. Resembling both The Han Show and The House of Dancing Water, this show is a mixed theatrical form that combines circus acts, dance, high-dive stunts, water displays, projections, and live music. It is divided into four acts and an introduction. The ensemble cast includes around 60 artists, including a live band of five musicians who play every night from the gallery above the upstage proscenium. Following the resort’s main theme, this 90-minute theatrical journey is inspired by local culture, and by the subtropical nature of the region. The story follows a young man’s encounters with the mystical world of the jungle and its inhabitants, such as a flower girl, a cockroach, a butterfly and a snail, among others. It is a journey about discovering and falling in love with the beauty and fragility of nature. As emphasised by Stufish Entertainment Architects, the idea was to give the performance space an organic character. A low roof construction grid hanging 18 metres above the audience creates an intimate atmosphere of sitting “beneath a canopy of palm trees”. Besides this, ten performers’ gates are integrated into the roof structure and connected to a 3D-flying system. They allow performers to start their flight paths from the 9-metre-high circular catwalk and “fly” above both the stage and the audience area. In an effort to connect the building’s exterior and its surrounding vegetation with its interior, Stufish Entertainment Architects extended the floral geometry of the rooftop construction and the folding roof pattern with organic scenographic elements.

According to Tkacz, the first phase of the theatre’s development lasted one year. The meetings between Stufish Entertainment Architects, the Wanda Group and Auerbach Pollock Friedlander took place in Beijing and were focused on the architecture. Because the show’s conception evolved at the same time as the theatre and its scenography were being designed, modifications were made along the way. In order to create an impression of infinite space, the dry stage area went through two major alterations, influencing changes in the theatre’s architecture during schematic development. According to Woroniecki, roof construction had to be adjusted in accordance with the acoustic resonance of the flight paths. After construction began, Tkacz worked closely with Dragone’s team in Belgium to develop scenography for the show. The proscenium opening of the dry stage is framed by an organic construction referred to by Tkacz as “dragon roots”, an attempt to convey the idea of “nature taking over the
This permanent piece of scenography is curved towards the auditorium and rises over 9 metres to the upper-grid level.

Due to the low grid, there is not much space to hang and store scenography elements on the exposed roof construction. The oversized lotus flower, the only scenographic element stored in the upper grid, needs to be removed when the scene is over. This computer-controlled automated construction in the shape of a flower hangs upside down, and opens its petals while travelling from the 9-metre-high gallery towards the stage, revealing the lead artist performing a trapeze act. Once the scene has finished, a group of performers remove the flower and roll it upstage. Additional scenographic elements stored under the central upper-grid platform are eight rolled-up projection screens. When pulled down, they create a 15-metre-high octagonal cylinder with projected floral patterns on the central stage. When the scene ends, the screens are rolled back up to the grid. Scenographic elements are thus put into place by the performers themselves during the transitions between acrobatic numbers. Tkacz has stressed that not all the scenography is automated since, for this show, Dragone preferred simple solutions and scenic elements that can easily be moved by performers or by stagehands to transform the stage. Tkacz gives an example of the backdrops of the dry upstage area. Roots-shaped cut-outs of flat panels are hung on the net backing and moved manually by the stagehands to close the space and focus audience attention on the pool stage. She also mentions the Bodhi tree, a scenographic element turned into a maypole by performers who bring baskets with ropes onto the stage.

The Live Design International journal reports that most of the scenery was produced in Yang Liping in Beijing. The same company had produced scenography for The Han Show and was already acquainted with submersible scenographic constructions and corrosion issues. In the article “To Dai For”, Live Design International (December 2015) also gives a very detailed description of the technical challenges, the lighting and projection technology and creating the show in a place very far away from other, bigger cities in China. For the purposes of this article, I will only highlight a few aspects. Kjell Peersman, the production’s technical director, has highlighted the importance of regular creative sessions with the designers and the creative team in the two years before the show opened to determine how best to position the technical equipment in the performance space. Like Anne Robb (quoted above in connection with The House of Dancing Water), he has also emphasised the significance of maintaining...
water quality and temperature to ensure the artists’ safety and prevent any health issues, and of preserving a different temperature onstage and in the auditorium because of the high level of moisture in the air.\(^50\) According to Peersman, The Dai Show Theatre has 200 employees, including performers, technicians, administrators, ushers, caterers, and custodians. The technical crew that runs the show comprises “four automation, eight rigging, four sound, four special effects, ten lighting and projection, nine carpenters, 15 wardrobe, and four stage management”.\(^51\)

**Remembering Gordon Craig: Practical and Spiritual Aspects of Aquatic Theatres**

*a. The Aquatic Stage in Motion*

Following the development of aquatic theatres with the help of the three examples in China, we could say that some of Edward Gordon Craig’s ideas regarding the wordless theatre, where music and stage kinetics give rhythm to the architectural drama, have found fertile soil in popular entertainment. The wide variety of options offered by these stages corresponds closely with Craig’s notes for *Scene* and his description of the ideal stage as “...a floor which divided into squares—might be movable—thereby obtaining at any time as many variations of the form of the floor not only such as steps—platforms or seats etc. but such as deep wells...”.\(^52\) In contemporary aquatic theatres, stage lifts travel 5 to 7 vertical metres underwater to reveal the pool. These custom-designed wet stages are not meant only to illustrate a well, a pond, a river, or a sea, nor to replace the safety nets that put performers of breath taking trapeze acts out of harm’s way. They also provide storage for scenography elements that emerge out of the water, like Craig’s kinetic cubes, rising 10 metres above the stage as ship masts do in *The House of Dancing Water*. Above all, they offer a water supply for the creation of aquatic scenography that can communicate with the audience on semiotic, emotional, and haptic levels. Furthermore, modern rigging equipment and automation systems enable simultaneous aerial acts by multiple performers above both the stage and the audience area. In some cases, they also lift and lower high pieces of scenography from the fly galleries, for example, the columns in *The House of Dancing Water*, in the way Craig’s early designs for *Scene* showed cubes dropping from the upper grid.\(^53\) Music, which Craig considered an inseparable part of the theatrical arts’ holy trinity, is specially written for each aquatic show and performed live. One of Craig’s earlier projects, *The Steps* (1902-1905),
even includes a description of two fountains that “rise and rise” to convey the joy and innocence of the children in the scene. In aquatic shows, fountains that rise up to 18 metres above the stage, created by hundreds of powerful jets, and waterfalls dropped from the upper grid serve as “liquid screens” that reflect a new quality of projected images. They immerse the audience in the spectacle through water splashing from the pool stage, colliding fountains, and streams that shoot water across the auditorium and from between audience seats as in The Dai Show. Even though the use of water as scenography is as old as the staged naval battles in ancient Rome (naumachia), aquatic and stage technology has enabled the rediscovery of water as a device to articulate a contemporary “language of symbolic movement” in scenography.

Craig was aware that methods from the past (and the present) could not be used to shape the theatre of the future, and he urged new generations of artists to be inventive in the search for theatrical means that might implement movement. His vision of wordless drama suggested a ritualised performance form, an idea from which aquatic shows in China often draw inspiration. Instead of using words, these shows embody physical theatre, circus numbers, acrobatic and high-dive acts, dance, and music, and collect all this into simple narratives of imaginary myths and legends. However, the story in aquatic theatres, as Tkacz noticed during her work on The Han Show and The Dai Show, is not the main driving force behind the designs. Dragone’s work rather revolves around visual images and environments that recall Craig’s description of Scene in his essay Motion.

As Denis Bablet reminds us, Craig’s most important contribution was his holistic approach to the theatre as a Gesamtkunstwerk, and the creation of dramatic atmosphere through the harmony of “colour, lines, movement, and light” accompanied by music. His plea for the Über-marionette was not a move against human performers, but one against the “actor”. Inspired by the symbolic movements of the Noh theatre, he was striving towards “depersonalised emotions by muscular tension”, and a new form of acting based on symbolic gestures. Circus artistry with its trapeze acts and acrobatics in aquatic shows exclude any useful or realistic movements, a characteristic that Craig highlighted when referring to the gesticulative quality of the puppets. He even considered Chinese theatre, and its stylisation, an ideal and a source of inspiration. On the vast stages of aquatic amphitheatres, which dwarf the human figure, group performances of highly stylised choreographies and circus acrobatics overshadow
individual acts, making this an ensemble effort. These group scenes are often reminiscent of the chorus in ancient Greek drama, one of the favourable elements of traditional theatre that Craig aimed to preserve. At the same time, the colourfully designed make-up that covers the performers’ faces resembles masks, an important aspect of Craig’s costume designs, especially at the beginning of his career as a scenographer.

b. The Architectural Stage

Craig’s idea of an “architectural stage”, a bare stage with square columns rising from the floor, cubes dropping from the fly gallery, and easily manipulated screens that could be arranged “until a harmonious and ‘complete form’ was assembled”, has intrigued many theatre artists, especially architects, throughout the twentieth century. While the conceptual projects of Farcas Molnár (U-Theater 1924), Joost Schmidt (Mechanische Mehrzweckbühne 1925) and Andreas Weiniger (Kugel-Theater 1926) were more abstract ideas, Walter Gropius brought some concrete suggestions in Total Theatre (1927), such as reconfiguring the auditorium seating by rotating seats on a turntable. This idea was picked up again after the Second World War and developed further by Sean Kenny. In his concept study for a flexible theatre building Study ’63, he envisioned a flexible structure that could switch its configuration between proscenium, trust, arena, and double stage. His sketch for the theatre in the Dunes Hotel (1963) mirrors the disposition of some contemporary aquatic theatres. Josef Svoboda also developed theatre concepts that echo Craig’s kinetic stage for Scene, most notably at the Théâtre d’Est Parisien (1972-74) and the Laterna Magica (1980).

Polarised discussions regarding flexible theatres heavily equipped with the machinery needed to reconfigure the performance space have followed this architectural concept since its earliest beginnings. Even though none of the aforementioned examples were actually realised, and will thus be remembered only as visionary architectural ideas, some rare flexible-theatre rooms have found their way to fruition. Berlin’s Schaubühne (1978-81) has had the opportunity to test some of these ideas in practice. This unique performance space consists of 76 floor panels, each supported by tensioning arms that can lower floor segments individually up to three metres beneath the stage level. It is interesting to note that, after more than 30 years of practical experience and a wide variety of spatial experiments, the Schaubühne today uses this space predominantly as three
separate stage units, and organises them in the proscenium manner: stage on one side and audience on the other. As a repertoire theatre, the Schaubühne is neither logistically nor financially in a position to facilitate major spatial changes during the theatre season. According to Helmut Müller, the technical supervisor of the Schaubühne, such modifications involve complex manpower logistics, the regular maintenance of stage technology, and the constant improvement of safety regulations. They demand not only the time required by the revamp but also additional funds. Changing the scenography and repositioning the audience seats between shows would overburden the theatre’s logistics capabilities, forcing it either to accept less complex transformations or, ideally, to limit these to seasonal updates. At the end of the day, the more financially viable option is chosen. Although it depends a great deal on state funding, the Schaubühne is forced to cover a huge part of its expenses on its own. This is done through ticket sales and world tours. The costs of the corrective maintenance of the mechanic support system are immense. It is only through the joint financial efforts of government subventions and the house revenues that all the expenses can be paid.

c. The Perception Machine

Apart from rare comments regarding quick screen changes that happen “almost in the moment”, Craig hardly discussed the practical and financial aspects of the Scene. As the aquatic shows in China demonstrate, realising and maintaining a performance space that operates as “a living thing […] capable of expression”, is an adventurous undertaking. The shows considered above demonstrate the undoubtedly wide spectrum of emotional landscapes that the movement of water can achieve on the kinetic stage: falling in love (a playful choreography of multiple jumping jets), danger (rain falling from a 20-metre-high upper grid), revenge (fountain columns aggressively shooting up to 18 metres in the air between villainous characters), and harmony (a combination of jet shooters that create a variety of open and enclosed spaces), to name only a few. As these examples prove, complex mechanical and technological infrastructure is needed for the theatre architecture and scenography to assume an active role in the spectacle and indeed act as performers themselves. To achieve expressiveness of this kind, the infrastructure of aquatic theatres combines devices from diverse industries, such as information technology, aircraft, water filtration, and automobile, as well as military and hydraulic...
engineering. This particular type of performative architecture not only generates high production costs but also demands close monitoring, preventive maintenance, repairs, and strict safety regulations both in the air and under the water.  

Training the crew for the technically advanced aquatic shows in China necessitates special preparations. As noted by Anna Robb, general stage manager of The House of Dancing Water Theatre, “No one comes to the stage management department and can hit the ground running. It takes 3 months to train an assistant stage manager, 6 months to train a stage manager and 9 months to train a show caller (3 months following their stage manager integration)”. Robb has also emphasised the complexity of show calling, which is carried out by two people: “There is the Show Caller who controls what the audience sees and an Aquatics Caller who controls all the activities and communication under water. When a prop is set under water on a lift and the divers are clear, the Aquatics Caller gives the Show Caller a clear so that the Show Caller can call the lift up and out of the water. Same goes for the performers. The Aquatics Caller gets the performers into position under the water and the Show Caller calls them out on cue”. Furthermore, the live music featured in aquatic theatres poses a challenge for the acoustics of both the performance and the audience spaces. Mark Holden, of the JaffeHolden Acoustics Inc., who was the acoustics consultant for The Dai Show Theatre, highlights the difficulties with regard to the theatre’s roof construction: “To reduce destructive focusing of sound at the curves’ centre, the roof was folded and articulated with deep ridges and valleys. Roof materials were interwoven with sound dampening and resilient mats to eliminate rain noise and adjacent highway noise”. Len Auerbach, chairman and design director of The Dai Show Theatre, has underlined that the project’s success depends on close collaboration between all the parties involved in the theatre’s conception.

As Erika Fischer-Lichte has observed, mechanised scenography is not only technical structures. It is also apparatus that enables different forms of perception and different means for the expression of emotional moods. However, “expression” is more typically associated with Adolphe Appia, whose work did not rely on the physical movement of scenography, than with Craig, who aimed for “suggestion” as a means “to create the atmosphere of mystery that was considered most conducive to the perception and revelation of Truth and Beauty”. For Craig, “suggestion” as a way of using symbols to visualise “the inexpressible in things” seemed
more appropriate for mystical and spiritual discovery. While his symbolism targeted the intellectual and artistic elite, the use of symbols in aquatic shows reaches out to the mass audience. The ritual act of the monks who attach the ropes to the ring and weave them to create the Bodhi tree in *The Dai Show* resembles Craig’s sketch of the Harlequin’s symbolic manipulation of a string attached to a long stick. This type of movement, associated with ritualistic practices, aims to convey spiritual experience in aquatic shows through their *mise en scène*. Especially in *The Dai Show*, “transformation”, the key word used by Dragone during the design process, happens through the performers’ choreographed movements, echoing Craig’s “mystical union with the universal rhythms of nature in such a way as to directly express the soul”.

**d. Marketing strategies**

Needless to say, aquatic theatres in China are not a random phenomenon. Developments in Las Vegas since the end of the 1990s show significant investments in non-gaming activities, from upscale services and retailers to high-end entertainment. As of 2015, the leading earner in the city is the Wynn Las Vegas resort, followed by the Bellagio, both of which host prestigious aquatic shows: Franco Dragone’s *Le Rêve* and the Cirque du Soleil’s *O* respectively. Non-gaming activities at Wynn Las Vegas accounted for 67% of the company’s total revenue in 2014, among which *Le Rêve* alone accrued 211.5 million dollars. According to some surveys, *O*, which opened at the Bellagio in 1998, grossed over 1 billion dollars before January 2014. Learning from Las Vegas, Macao backs the trend. Melco Crown Entertainment, an Australian tourism and entertainment company, invested 250 million dollars in creating *The House of Dancing Water*, providing significant exposure to the City of Dreams in Macau. Between 2010, when the show opened, and the following year, Macau, which is the only market in China to have legalised casino gaming, has seen 42.2% growth in gaming revenues, generating 33.4 billion dollars in 2011. According to Melco Crown’s annual report in 2011, this was 3.5 times more than that year’s gaming revenues in Las Vegas and Atlantic City combined. Judging by the success of *The House of Dancing Water’s* first six years, with an average audience attendance of 85%, the show has pulled its weight in contributing to these developments. Melco Crown Entertainment claims that over four million spectators saw the show before September 2016. It is expected that it will follow the example set by the
Cirque du Soleil’s *O* at the Bellagio, which will celebrate a 19-year run this year. With an increasing number of visitors bypassing gaming areas, investments in unique non-gaming entertainment such as aquatic theatres have become an important part of a successful resort’s management strategy.

The Han Show Theatre and The Dai Show Theatre are the result of a different kind of market development. At the China (Sichuan) International Tourism Investment Conference in 2015, Dalian Wanda Group chairman Wan Jinalin presented the company’s strategy to become the world’s largest tourism enterprise. Transforming the company, which aims to make 100 billion yuan in annual tourism revenue by 2020, involves building the Wanda Cultural Tourism Cities, world-class resorts for entertainment and leisure. Of the 15 Wanda Cities the company has set to realise in China by 2020, three are already in operation: White Mountain Resort, Wuhan Central Cultural District (The Han Show Theatre), and Xishuangbanna Resort (The Dai Show Theatre). Another seven are currently under construction. To enable the Wanda Cities to overcome climate restrictions and function throughout the year, the company combines outdoor theme parks with large indoor entertainment areas, commercial centres, high-end hotels, and, in the case of Xishuangbanna Resort, even a hospital. To achieve this goal, the Cultural Tourism Planning & Research Institute, founded by the company, employs more than 300 creative specialists, and fosters collaboration with the best professionals in the business. Striving for “innovation”, a key word used by Wan Jinalin at the conference, has put aquatic theatres on the map, making them an integral part of the Dalian Wanda Group’s cultural-tourism-development strategy in China.

**Conclusion**

Craig’s portfolio, with etchings entitled *Motion*, presented the idea of a theatre liberated from the constraints imposed by the literary text, old-fashioned scenery, and actors’ impersonations. It was an attempt to unleash movement through a flexible architectural space, music, and superior “dolls”, and to use all of these as a “means to communicate the greatest human truths”. To achieve complete harmony, Craig suggested that “tender liquid light” should fill the screens. Interestingly enough, more than a century later, precisely “liquid” light has enabled the realisation of the modern-day *Scene*. Supported by cutting-edge technology, water as a scenographic device has immersed spectators into the tangible world of
aquatic theatres, reminding us of the importance of haptic stimuli in our experience of the world. It has introduced a different quality of kinetic performance space, and projected images mapped onto "luminous architecture" made in a splash. On the other hand, Craig’s ideal, which rejected the dominating theatrical effects, decadence, and commercial exploitation of the “new” theatre, remains unfulfilled. Following the development of aquatic theatres, we can note the progress of their spatial separation from resort complexes and gaming areas, but they still stay closely linked to the broader context of the entertainment and leisure industry. Like many other architects and designers who have aspired to develop new types of theatre, Craig understood that “new” theatre needs a new spatial environment. The gap between the idea and the execution was also Craig’s reason for rejecting conventional theatre. Denis Bablet has suggested that Craig’s almost religious concept of theatre, which headed towards mysticism, could be placed between “dream and experimental study, between utopia and discovery”. Taking into consideration that Craig’s notions existed solely in his imagination, and held some contradictions, Christopher Innes has observed that his legacy can only have an effective impact in the form of inspiration.

To conclude, the examples discussed here clearly demonstrate the financial, technological, and logistical power needed to put some of Craig’s ideas into practice. I have used a descriptive but predominantly numerical approach to outline these challenges. After all, in the globalised capitalist culture of today, ideals are out of place, and the truth, at least with regard to aquatic theatres’ kinetic stages, is expressed in numbers. In the business of popular entertainment, where concrete achievements, figures, and profits count, compromises have to be made. Whether the stage kinetics and water displays of aquatic theatres are capable of expressing “all the Revelations of Truth” through the art of movement is still open to question. Based on our examples, there is no doubt that they can suggest the characters’ inner emotional moods, morph the scenographic environment to mirror the constant changes of the world itself, and so accentuate aspects of architectural drama. But what options are we left with when it comes to conveying our personal truths in popular entertainment? If we follow the mystical path aiming for Revelation, we could try to adjust our breathing in accordance with the rhythm of the stage, and be in the moment when the sublime presents itself onstage. If we are aspiring to Harmony, we might choose a front-row seat, put on the rain poncho, and allow ourselves to be
immersed in the aquatic spectacle, rediscovering our existence as an integral part of “the cyclical patterns of nature”. Or we can put all our prejudice and ideals regarding the “new” theatre aside, let loose our inner child, and, at least for a moment, surrender to the Beauty of a splash.

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Notes
4 The pool stage refers to the central pool in aquatic theatres that is used as a stage for a variety of acts (high dives, trapeze and Russian-swing acts, etc.). It can be opened or closed by a system of vomitory lifts whose number differs in each show.
5 The House of Dancing Water (City of Dreams, Macau) – Artistic Director: Franco Dragone; Scenic Designer: Michel Crête, Architect: Li Chung Pei, Costume Designer: Suzy Benzinger, Composer: Benoit Jutras; Make-Up Designer: Carmen Arbues; Fountain/Special Effects Designer: Denis Lafontaine; Acrobatic Performance Designer:
Andrew Watson; Lighting Designer: Luc Lafontune; Video-Content Designer: Patrick Neys. See also www.thehouseofdancingwater.com

6 Le Rêve (Wynn Las Vegas) – Director: Franco Dragone; Production Designer: Michel Crête; Theatre Designer and Set Designer For The “Pièce Montée”: Claude Santerre; Costume Designer: Claude Renard; Lighting Designer: Koert Vermeule; Choreographer: Giuliano Peparini; Aquatic Choreographers: Dacha Nedorezova, Jacky Beffroi; Aerial Designer: Didier Antoine; Composer and Musical Director: Benoît Jutras; Make-Up Designer: Carmen Arbues Miro.

7 O (Bellagio, Las Vegas) – Founder and Creative Guide: Guy Laliberté; Director: Franco Dragone; Artistic Guide: Gilles Ste-Croix; Stage Designer: Michel Crête; Costume Designer: Dominique Lemieux; Acrobatic Choreographer: Debra Brown; Lighting Designer: Luc Lafontune; Sound Designer: Jonathan Deans; Sound Designer: François Bergeron.


9 An air compressor sends water to an air accumulator under pressure, which filters the air before inducting it into the pool to ensure good air quality in the water. As reported by Light and Sound International: “To provide some camouflage, six huge Gardner Denver compressors in the basement push out 125,000 litres of compressed air per minute through 380 air effects pods attached to the floor of the pool” (Harper 2011, 48).


11 Ibid.

12 Ibid.

13 As reported by Joe Brown in The Las Vegas Sun, the 1.1-million-gallon pool in Le Rêve “fills up in 12 hours, pumping water at 1,500 gallons per minute, and can drain in six hours, pumping water at 2,800 gallons per minute” (Brown 2008). Draining the 1.5-million-gallon pool stage from the O theatre into the Bellagio Lake also takes 12 hours (Katsilometes 2016).

14 (Harper 2011, 46).

15 The Han Show (The Han Show Theatre, Wuhan) – Director: Franco Dragone; Theatre and Equipment Design: Mark Fisher; Set Designer: Francois Séguin; Costume Designer: Tim Yip; Director of Creation: Line Tremblay; Associate to the Director and Choreographer: Anne Tournié; Comedic Character and Act Designer: Wayne Wilson; Human Performance and Machinery Designer: Jaque Paquin; Human Performance Designer: John Bradyl; Music: Benoit Jutras; Make-Up Designer: Carmen Arbues; Lighting Designer: Alain Lortie; Fountain and SFX Designer: Denis Lafontaine; Sound Designer: Vikram Kirby; Video Designer: Patrick Neys; Dramaturge: Vincent Engel. See also www.stufish.com/project/the-han-show-theatre .


19 Ibid.

20 Ibid.


22 (Müller 2014).

23 Mauricio Moe Defendi, Wanda Han Show Operations Technical Director, in discussion with the author, April 2017.

24 “Backwashing water filters are large tank-style filters that get their name from the fact that they clean and renew themselves by backwashing. Backwashing consists of reversing the flow of water so that it enters from the bottom of the filter bed, lifts and rinses the bed, then exits through the top of the filter tank.” Accessed on February 10, 2017. https://www.purewaterproducts.com/articles/how-backwashing-filters-work.

25 The chemicals used in the process are: “Liquid Chlorine (bleach) as a sanitiser, Cyanuric Acid (chlorine stabiliser) to control the alkalinity (PH), the Knoor IS-3 enzyme to metabolise oils and carbon contaminants, and the Knoor Pulsar System, a water clarifier that turns all contaminants into small flocculants, so that they can be absorbed by the filters.” Mauricio Moe Defendi, Wanda Han Show Operations Technical Director, in discussion with the author, April 2017.

26 A flyboard is a board connected to a PWC turbine that allows performers to use water pressure to rise up to 15 metres above the water’s surface and perform freestyle figures in the air. Accessed on February 3, 2017. http://zapata-racing.com/flyboard-en/.

27 The Dai Show (Jinghong, Xishuangbanna) – Artistic Director: Franco Dragone; Theatre Architecture/Stage Design: Maciej Woroniecki, Alicia Tkacz (Stufish Entertainment Architects); Show Directors & Choreographers: Andre Kasten, Leah Moyer; Art Director: Pascal Jacob; Creative Consultant: Yang Li Ping; Associate Director: Phenix Lin; Acrobatic Choreographer: Edgar Zendejas; Lighting Designer: Olivier Legendre; Sound Designer: Corrado Campanelli; Human Performance & Machinery Designer: Jaque Paquin; SFX Designer: Denis Lafontaine; Composer, Arranger & Orchestrator: Michael Brennan; Costume Designer: Nicolas Vaudelet; Video-Concept Designer: Patrick Neys; Make-Up Designer: Carmen Arbues. See also www.stufish.com/project/xishuangbanna-theatre-2.


29 Ibid.

30 Ibid.

31 A 3D-flying system enables performers to move through the air in all directions.


33 Maciej Woroniecki and Alicia Tkacz (Stufish Entertainment Architects), architects and designers of The Dai Show Theatre, in discussion with the author, February 2017.
34 The pool-stage pit is 8 metres deep in total. The central stage lift can only go down 5.5 metres because of the stage mechanics underneath it.


42 Lampert-Greaux 2016.

43 Maciej Woroniecki and Alicia Tkacz (Stufish Entertainment Architects), architects and designers of The Dai Show Theatre, in discussion with the author, February 2017.

44 Lampert-Greaux 2016.

45 Alicia Tkacz, in discussion with the author, February 2017.

46 Lampert-Greaux 2016.

47 Ibid.

48 Ibid.

49 Ibid.

50 Ibid.

51 Ibid.


54 (Innes 1998, 139).

55 (Semar cited from Buckley 2013, 210).

56 Ibid.

57 (Buckley 2013, 209).


61 (ibid, 186).

62 (Buckley 2013, 211).

65 (Ibid, 79-81).
67 Helmut Müller, technical supervisor of the Schaumbühne, in discussion with the author, June 2014.
70 Craig/Yeats 1915, 148.
73 (Prosser 2014).
74 Ibid.
75 Ibid.
78 Ibid.
79 Ibid.
80 (Innes 1998, 65).
81 (Ibid, 113).
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