

National Theatre

Thinking In 3D: Scale Models For The Olivier Theatre

Eleanor Margolies

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Thinking In 3D: Scale Models For The Olivier Theatre

Eleanor Margolies

The scale models used in theatre design have a paradoxical status: set models are made with incredible artistry and accuracy, but they pass through many hands, often getting dented or spattered with paint along the way, and rarely survive beyond the lifetime of the production. The 'Playing with Scale' exhibition arrests the usual process of discarding the model in order to understand more about how models are used by designers and how they enable collaboration with many other people. It is impossible to give a complete account of this process, since it varies enormously depending on the designer, the production and the context. The exhibition includes the work of seven designers responding to a very distinctive space, the Olivier Theatre at the National Theatre, as well as a brief discussion of the role of models in the design of the theatre itself. The set models on display have been acquired by the National Theatre Archive, or saved by the designers themselves. The archive of Jocelyn Herbert (held in the National Theatre Archive) has been a vital starting point, since it includes model pieces from dozens of productions, along with copious sketches, correspondence and diaries discussing the evolution of the designs. The following short essays describe three productions from the first ten years of the National Theatre, then leap over 20 or so years to more recent productions.

Models of very different types are made as part of the process of theatre design. Some will be improvised from a sheet of paper and a coffee cup during an initial meeting with the director; others will require weeks of work from teams of model-makers. Some are 'sketches in three dimensions' for experimenting with materials, spatial relationships and sculptural forms. Others serve as 'specifications in three dimensions', defining a space which will eventually be brought into existence by engineers, set-builders and scenic artists. In a devising process, models can be looser

indications of intention, since they will be combined with experiments in the rehearsal room with space and objects at life size. In a large theatre or opera house (and especially in theatres where, as in the National Theatre, several shows alternate over a period of time in a repertory system), design decisions often need to be confirmed well ahead of rehearsals.

Most set models are made at a scale of 1:25 (or in the United States 1:24). That means a door two metres tall is represented on the model by a door 8cm tall. This gives a good balance between level of detail and portability. Sketch models are often half that size, at a scale of 1:50, making it easier to carry scenic ideas to meetings. Life size mock ups are sometimes needed in rehearsal; in the German practice of holding a *Bauprobe* (construction rehearsal), scenic ideas are built at full scale on the stage, using stock flats or unfinished timber and cardboard, to enable discussion by the whole team of the possibilities and allow for immediate adjustments in dimensions and angles.

A final model of a set can be a beautiful object – but its usefulness goes far beyond wonder at the skilful creation of a miniature world. Architect Christoph Grafe describes seventeenth-century Dutch dolls' houses in a way that resonates with the experience of looking at set models for theatre: This sense of privilege, of looking in from the outside and being secretly involved is probably the source of the intense pleasure that models of interiors induce, both in their creators and their viewers. The viewer is witness and accomplice, actor and knowing spectator. The model is an incomplete scenario: it is up to the viewer's imagination to fill the characters and the rooms with a narrative, and the invitation is compelling.¹



Jocelyn Herbert sets up the model for her design for John Osborne's play *Inadmissible Evidence*, directed by Lindsay Anderson at the Teatr Współczesny, Warsaw in 1966.

Jocelyn Herbert Archive JH/9/27

But while the theatre model can also be regarded as 'an incomplete scenario' that invites performance, a realistic interior is only one kind of possible world. Theatre design has always brought into existence worlds far beyond the domestic interior: landscapes, cityscapes, dreamscapes, atmospheres. The making of a 'world' may involve subtle interventions into an existing space – perhaps drawing attention to what's already there rather than making new physical objects. Rachel Hann describes scenographic work as involving 'acts of orientation that complicate, reveal or score processes of worlding'.² And set models, unlike dolls' houses, are always in a conversation with a previously existing space. As Soutra Gilmour says of her work: 'it is always site-specific, whether I am in a found space, West End proscenium theatre or the Olivier. It's a dialogue with the place'.³ Building a model is a way of thinking in three dimensions, looking closely at a space and speculating about its possibilities.

For the designer, building a model combines speculative exploration of materials and three-dimensional space with practical questions about how objects will be constructed and (if necessary) move. Lizzie Clachan describes models as a 'problem-solving tool': 'If it's hard to make something stand up in the model, it's going to be the same problem in real scale.' Having built a physical model, she can 'look makers in the eye and know that I haven't tried to defy physics'. Production manager Anna Anderson makes a similar point about the usefulness of a model when planning scene changes: 'It's great to work with a physical representation of the set because objects can't just "disappear" – particularly in the Olivier. It's much better than just talking about ideas.' The period of model-making in the studio can allow for a time of reverie in which new ideas emerge. It often involves dialogue with collaborators such as design assistants and model-makers, who bring their own artistic sensibility to the work as

well as interpreting designers' indications about the feel of a production, its look, colour and texture. As discussed later in the essay about *Exit the King*, there is also a significant dialogue with materials.

All model-making involves selection and distillation of ideas. As David Neat puts it, a scale model is 'a filter and a focus for the designer'.⁴ The design process for theatre thus involves 'zooming out' to a distance at which the whole performance space can be held in mind, and then zooming in to define the smallest physical details for construction. In this way, the set model also bears a relation to the models used in science to represent relationships that cannot be perceived by the human eye – the familiar 'ball and stick' models of molecular structures or the Renaissance models of the universe that feature in *The Life of Galileo*. As architect Asif Khan writes, 'Thinking across scales is a remarkable facility of the human mind. We can conceive of galaxies and atoms in the same sentence'.⁵ Physical models have always played a significant role in the exercise of this facility to 'think across scales' because models allows us to grasp something. Not solely by holding them in our hand, but precisely because we can hold them. Even when looking without touching, the body is engaged by the three dimensional. By moving our heads in relation to the model, we reconfigure the relationships between objects in space and see new patterns and structures. Thinking across scales is ever more essential as we struggle to grasp human impact on both microscopic and global scales.

The model in the theatre design process

After a performance ends, set models are usually scattered, destroyed or discarded. Writing about architectural models, Karen Moon warns that their inherent fragility means that the models that do survive will only ever be part of the story: 'The larger the model, the more difficult it is to keep; the smaller, the more easily lost; the more refined, the more liable it is to damage; the more crudely made, the more likely to be discarded'⁶. Sketch or working models for the theatre are rarely preserved and few designers have storage space to keep complete final models in their studios. For theatre designer Johannes Schütz the model is inherently transitional: 'A model is like a manuscript or like a polemic – it is supposed to achieve something. Then it is replaced by something else, the right thing, and the model is no longer important'.⁷ Some models survive. Figures, furniture and complicated architectural elements like staircases are often kept by designers. They form a 'props store' in miniature that designers can draw on when working on a new design, trying out the idea of a chair or a table in a space, perhaps in discussion with the director, without having to spend hours building model pieces from scratch.⁸ A very few models are acquired by museums. But whether on display behind glass, or in store and only accessible for researchers, they are no longer available for improvisatory play.

While final models are displayed in theatre museums or foyers, the many earlier stages are rarely seen by the general public. 'Working' or 'sketch' models of theatre designs are usually made in unpainted card, without any surface detail, so that they can be easily reworked – a new door cut or a wall moved. There may be dozens of such sketch models made over several months, shared with directors and production managers as ideas evolve. For Anna Anderson, this is the most exciting period of the process because 'everything is still possible. Everyone can be honest about what they really want and we can then talk about how we can deliver that'. The series of working models culminates in a showing of a 'white card model'. The white

card model is used to calculate the feasibility and cost of the design. Once agreed, a 'final model' is made, complete with colour and indications of the final materials. Depending on the complexity of the design, this can take many hours of model-making. Matt Hellyer, design associate on Vicki Mortimer's design for *Follies*, led a team of six people constructing that model for over four weeks. In a smaller production, a more gestural model may be all that is needed as a tool in direct conversations between the designer and makers.

Set models work hard. At the National Theatre, a final model goes first to the digital drawing office, where it is used to create digital construction drawings. There are model showings for the company on the first day of rehearsal, and separately for other departments such as press and box office staff. Photos might be taken to create a reference 'storyboard' for the production. Then the model goes to the workshops, prop makers and scenic artists, along with sketches and photographs to provide extra detail. It may be taken into the theatre for the fit up to check that nothing has been forgotten. Models are also explored in sessions organised by the NT Learning department for students and young people, and as a fundraising tool, shown to donors as an object of wonder and a proxy for the concentrated craft that goes into making the whole production.

The 'one room' feeling

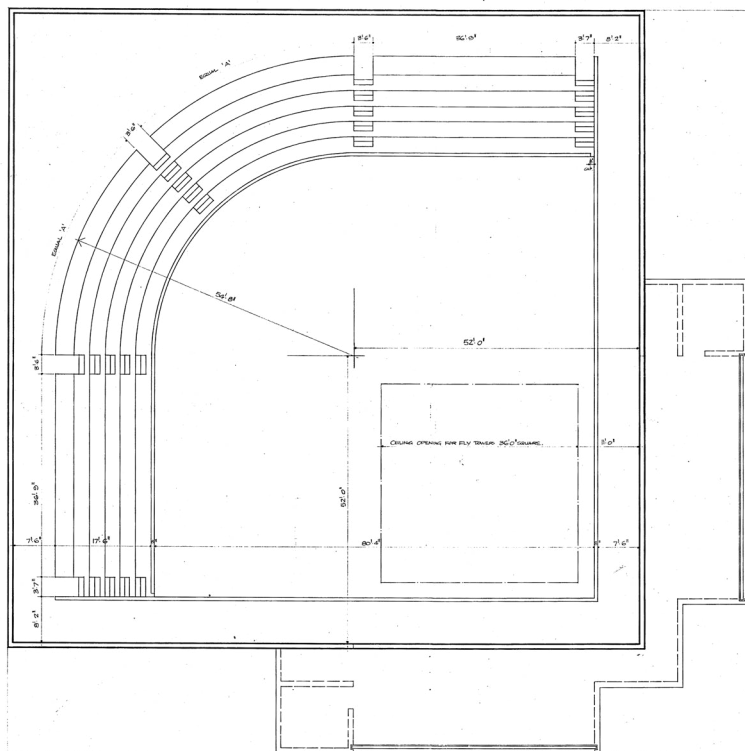
We searched for a single room [...] whose spatial configuration, above all else, would promote a dynamic and emotional relationship between audience and actor – between a fixed architectonic geometry of vision, acoustics and concentration and the chance irregular demands of dramatic performance. We searched for an open relationship which looked back to the Greeks and the Elizabethans and at the same time looked forward to a contemporary view of society in which all could have a fair chance to hear, see and share the collective experience of human truths. – Denys Lasdun⁹

In the development of the Olivier auditorium and stage, models played an important role, even more so than is typical in the architectural process. This was partly due to the working practices of the architect, Denys Lasdun, and partly because he was in dialogue with theatre directors and designers used to thinking through models.

Even though Lasdun's practice was relatively small, he employed a full-time in-house model-maker, Philip Wood, describing him as his 'right-hand man'. Barnabas Calder comments that this enabled Lasdun 'to design in three dimensions throughout, rather than in two-dimensional representations of 3D'.¹⁰ In developing his designs for the Oliver, Lasdun commissioned hundreds of models at different scales and levels of detail.

In the early stages, Lasdun and his team used wooden blocks to represent essential elements such as auditoria, workshops, dressing rooms, offices and foyers, placing the blocks in 'different dispositions on a model showing the context of the site'. This was a way to try out the relationships between the component parts as well as the overall shape of the building. They made dozens of working models at 1:50 or 1:100 scale in card and wood to explore different relationships between stage and auditorium. A much larger model, at 1:8 scale, was constructed to use in testing acoustics. Details such as how the railings would be joined to the external concrete parapets were considered through a series of drawings and models, including a full-size mock up. Lasdun even proposed to build a full-scale model of the whole Olivier auditorium, saying in October 1964, 'I would not like to take the responsibility for Scheme B without, say, six producers playing around with the model, and we should also, at some time, need a mock-up in a field somewhere.'¹¹

The National Theatre Building Committee included (at various times) the directors Peter Brook, Peter Hall, George Devine, John Dexter and Bill Gaskill, theatre historian Richard Southern, lighting designer Richard Pilbrow and set designers Sean Kenny, Tanya Moiseiwitsch and Jocelyn Herbert. The semi-circular design of the Olivier was informed by the Ancient Greek theatre of Epidauros, which



GALLERY PLAN.

SCHEME B' MODEL

1/2" = 1' 0"
4-9-66 552/1033.15

Ground plan of Lasdun's 'Scheme B'
for the Olivier Theatre, September 1966.
Jocelyn Herbert Archive JH/11.

Peter Hall and Denys Lasdun had visited together. Lasdun's first proposal, Scheme A, was 'essentially a stripped-down proscenium theatre, without the actual proscenium arch that normally divides auditorium from stage'.¹² A second proposal, Scheme B, was much more radical, putting a square stage in the corner of a square room, with a balcony round three sides linking the stage and audience. The aim was to put the audience and actors in the 'same room'. Jocelyn Herbert joined the committee in 1966, following the death of George Devine. She wrote to Laurence Olivier about Scheme B: 'I agree with Peter Brook, and respond to the interest and challenge of the square, and the rigorous style of production, acting and scenery that it would dictate.' She went on to ask:

Is it not possible to be more inventive and flexible with the seating, and still not destroy the one room feeling? In fact enhance it. I think there is so much to be explored in this direction, i.e. Raking the sides of the auditorium sideways as well as back, cantilevering the circle back over the stalls, perhaps playing with different levels, or one complete bank of seats, steeply raked, more like a bowl.¹³

Members of the committee were invited to look at a model of the Scheme B stage and auditorium alongside a model of the Barbican Theatre.¹⁴ Writing to Olivier, Herbert praised the Barbican design for conceiving of stage and auditorium as a unity, but felt it offered 'no germ of adventure into the unknown and

unexplored', unlike Lasdun's proposal: 'I feel that there is some such germ in Scheme B. Which is why I believe we should go on working on it.' However, 'At the moment it is a geometrical formula. It doesn't exist as a theatre. We have to help the architects turn it into a theatre'.¹⁵

Herbert's letter suggests that at this point Lasdun in effect took little interest in the stage itself, dividing up the responsibility for stage and auditorium: 'Lasdun has always said (I think) that the stage and behind it are the theatre people's province and they must say what they want, but that the auditorium was his, and we must take what we get. I think this is a basically wrong conception.' In her view, this compartmentalization arose from a particular idea of what design for performance could be: 'I think that the architects still do not really understand the stage-auditorium relationship. They think more in terms of operatic pageantry that of plays with words and emotions that have to be communicated. Their attitude to decor seems to be decorative rather [than] functional.'¹⁶ Along with others, particularly members of the Berliner Ensemble and Joan Littlewood's Theatre Workshop, Jocelyn Herbert had initiated the mid-twentieth-century shift from 'decor' to 'theatre design'.

A sub-committee of the Building Committee was set up to develop Scheme B. Although many of Philip Wood's balsa and card models had been shared with the larger committee, the members of this group had an active relationship to the model based on their own practice: 'The director John Dexter and the designer Jocelyn Herbert, in particular, made significant contributions, cutting up models and experimenting with different options in a practical manner which recalled the *modus operandi* of the Lasdun office.'¹⁷

Jocelyn Herbert and Denys Lasdun retained a very friendly relationship from the time of working together on the Building Committee. She wrote to congratulate him on the opening of the Olivier. He replied, Over a decade now you have written the most wonderful letters of encouragement and appreciation. But this time you have written something which as an architect I shall always remember – 'the space

has such amazingly powerful vibes of its own'. Nothing could be said that would touch me more deeply. I had always hoped that someone somehow someday might sense this illusive [sic] quality.¹⁸

Lasdun refers to the drum revolve (which was not to function properly until ten years later), but agrees with Herbert that the 'machinery' is not 'the essence, which is concerned as ever with the spatial relationship between people sharing an experience'. He concludes that the Olivier 'urgently needs your special insights as a designer.' Herbert went on to design *The Life of Galileo* (1980), *The Oresteia* (1981) and *Square Rounds* (1988) for the Olivier, as well as Tony Harrison's play *The Trackers of Oxyrhynchus* (1988) which had a run in the Olivier after opening in the ancient stadium of Delphi. Lasdun wrote to congratulate Herbert on Trackers: 'What a treat to see the place properly used with your stunning design + Tony H's brilliant direction + writing.'

Perhaps because of her involvement in the Building Committee, Herbert remained very active in discussions about the use of the Olivier and potential alterations. While working on Galileo, she drew up plans for a new permanent stage to be used across all the productions in a season.¹⁹ When alterations to the Olivier were subsequently proposed by Peter Hall, she argued that it would be 'a great mistake' to provide for increased scenery flying, if the ambition was to use the theatre 'as the Arena Theatre it was always intended to be'. She regarded the installation of a permanent lighting rig as a much more important improvement, especially if the drum revolve could finally be made to work. Notably, the first question Herbert posed in her written response to the proposals was 'Has a careful model been made and studied?'²⁰

It is impossible to cover all the technical and aesthetic experiments that have taken place in forty years in the Olivier, but as the following examples show, the specific material and spatial qualities of the theatre, and the idea of a 'single room' continues to preoccupy designers to this day.

***The Plough and the Stars* (1977)**

by Sean O'Casey, directed by Bill Bryden.
Set designed by Geoffrey Scott.
Model made by Bob Crowley.

'The diamond-paned fanlight is destitute of a single pane, the framework alone remaining. The windows... are grimy, and are draped with fluttering and soiled fragments of lace curtains.' – ***The Plough and the Stars*, Act 3**

This was the second production designed specifically for the Olivier, though earlier productions had transferred from the Old Vic to open the new National Theatre building on the South Bank. The play is set in Dublin, just before and during the Easter Rising of 1916. Bill Bryden and Geoffrey Scott had previously made a 'recce' to the west of Ireland to research their 1975 production of *The Playboy of the Western World*, and now went to Dublin to look at its Georgian streets and pubs, where they were shown around by actor Cyril Cusack, who was to play Fluther Good in the production.

In Scott's design for *The Plough and the Stars*, the structure of the tenement building is fixed to the floor of a revolve, with movable flats added to create rooms, or the street outside. The drum revolve built for the Olivier was not yet functioning, so *The Plough and the Stars* used a manually operated revolve that had been constructed for the previous show, *Tales from the Vienna Woods*. The ground plan shows that the tenement building was placed on the centre of the revolve, bringing the performers close to the audience – the same position given to the main scenic elements in the 2018 productions of *Anthony and Cleopatra* and *Exit the King*.

Bob Crowley, who had joined National Theatre as an Arts Council Theatre Design trainee, worked on the model. Its detail draws on both O'Casey's stage directions and the research trip to Dublin. Tattered net curtains hang at

the windows and wooden beams brace the dilapidated building. Many reviews celebrated the sensitivity of the design. Maeve Binchy commented that 'once the stage revolved and we saw that bar ... I felt at home', and Charles Spencer wrote: 'Nowhere is the attention to detail more apparent than in Geoffrey Scott's settings. They evoke the atmosphere of the Dublin tenement with such microscopic accuracy that you can imagine the smell of the place, the creak of the floorboards.'²¹ Other reviewers reflected on the experience of staging a play written for a proscenium theatre in the new open arena of the Olivier. Recalling the production in 2018, Geoffrey Scott commented on the difficulty of putting realistic rooms onto the Olivier stage: 'we were all experimenting'. Bob Crowley noted how effectively the design closed in from the epic opening scenes to the cramped attic of the final act, succeeding in 'making the whole space so small and so concentrated'.

***The Life of Galileo* (1980)**

directed by John Dexter.

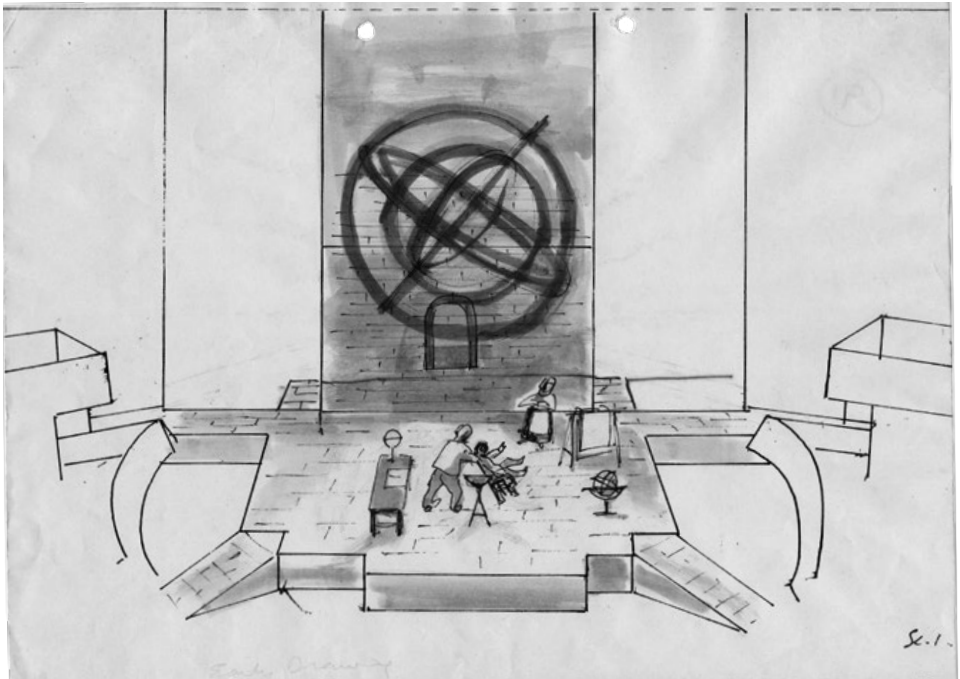
Set and costumes designed by Jocelyn Herbert.

Design assistant: Peter Hartwell.

It's an armillary sphere. It shows the way the ancient astronomers said the stars go round the earth. – ***The Life of Galileo* by Bertolt Brecht, translated by Howard Brenton.**

Galileo uses three-dimensional wood and metal models of the universe called 'armillary spheres' that allow the known universe to be held in the hand. The model he shows his young student Andrea in the opening scene has the Sun and planets orbiting Earth, fixed to 'crystal spheres'. It represents the

'geocentric' model of 'ancient astronomers'. Galileo's observations with the telescope will require a 'paradigm shift': replacing this geocentric model with a modern understanding that Earth moves around the Sun. But this conceptual shift is not easily made. Galileo sticks a fork into an apple – representing a man standing on the globe – but Andrea is unconvinced. He then picks up both Andrea and the chair he sits on, rotating them together in relation to a lamp: 'for now we know – everything moves!'



Storyboard drawing by Jocelyn Herbert showing the opening scene of *The Life of Galileo*.

Jocelyn Herbert Archive JH/4/63 3817

Brecht's play is full of discussion about how we understand models, as well as requiring (in this production) 105 separate props including globes, telescopes and other scientific instruments. As well as these props, and handheld armillary spheres, Herbert designed a huge sculptural version of the armillary sphere in copper. Herbert exposed the architecture of the Olivier: three metal shutters leading to the scene docks at the very back of the stage, previously painted black to disappear into the shadows, were polished and became part of the playing space. Wooden planks were laid over the floor on steel decking, with an additional wooden platform sliding forward from the scene dock at the very back. Simple wooden chairs and tables stood on a wooden platform, recalling Herbert's design for John Dexter's production of *A Woman Killed with Kindness* at the Old Vic in 1971.

James Hayes, who played the role of Federzoni, later recalled how the play opened. The armillary sphere was suspended over the floor, and at the back, the central shutter was open. The music started and 'way, way in the distance the light came up on a very simple platform which was on tracks, with tables and scientific instruments on it, and in the centre of it was a copper basin on a three-legged stand, and Michael Gambon was standing there, naked to the waist, with his young assistant, young Mark Brenner. And that's the way this play opened, this sphere flew out and this truck came down – and you knew you were in for a great evening.'²² Herbert felt the production was a success: the Olivier had at last 'become one place'.²³

Dexter and Herbert had collaborated for more than 20 years and always spent a long time working together with a model, discussing not just the look of the stage but also how the actors could move about on it. For one of their first productions, Arnold Wesker's *Chicken Soup with Barley* (1958), Dexter said, 'We did two weeks talking, looking at the ground plan, playing with bits of cardboard. We had to "sort out the plumbing", the geography of the place. You do that with any play, no matter how abstract.'²⁴ For *Galileo*, as with their collaborations on operas, Herbert drew storyboards to 'help plot getting actors from

one place to another and from scene to scene', and she flew to New York – where Dexter was living – with a model of the Olivier.²⁵

The rediscovery of open stages in the twentieth century put new emphasis on the reality of three-dimensional objects. In a 1992 radio interview, Herbert cited Brecht and the Berliner Ensemble as having brought the example of the 'essence of real props' to British theatre.²⁶ Jim Hiley describes how pressured the National Theatre workshops were in the run up to this production:

Throughout the summer, props staff worked every weekend; in the last nine months of 1979, some of them had come in literally every day. [...] But they welcomed the challenge of Galileo with its abundance of ancient scientific gear: three of them had spent several days researching at the Science Museum. And in common with [scenic artist] Yves Rassou, they liked Jocelyn Herbert because of the room to manoeuvre she allowed them.²⁷

The larger set elements of the *Galileo* model have not survived but the 1:25 props and scale model figures have been kept within the Jocelyn Herbert Archive, along with research material from museums of science and technology in England and Italy. The model pieces were stored loose in a small cardboard box and had suffered some damage. While this reflected the way in which they had been returned from the theatre and stored in Herbert's studio, they were at risk of further damage whenever they were handled. In 2018, they were conserved by Tabitha Austin, MA Conservation Camberwell College of Art. She identified a huge range of materials used to construct the models, including wood, textiles, plastic beads, wire mesh, coins, clay, paint and card. The archive also includes the full-size prop armillary sphere, which Herbert kept on a shelf in her studio.

***The Shaughraun* (1988)**

by Dion Boucicault, directed by Howard Davies.
Set designed by William Dudley.

*'It's a big enough piece, the emotions are big enough, in all its scale it's big enough for the Olivier. It won't be lost in it' – William Dudley*²⁸

William Dudley describes the rapid sequence of scenes in Boucicault's 1874 melodrama as 'filmic'. As an actor and theatre manager in New York and London, Boucicault was familiar with the technological resources of the theatre: the play was written for stages in which complex illusionistic sets created by highly skilled scene painters were shifted by huge crews. The theatre of the period achieved, says Dudley, 'a perfection of scene changing, where you'd get hundreds of people backstage – 30 men moving one set'. Theatrical productions included spectacles such as train crashes and sinking ships, with a sophistication that could not be captured by still photographs of the period.

Dudley aimed to achieve the same rapidity of scene changes as in the nineteenth-century productions, but using built scenery rather than painted cloths, saying: 'The Olivier really is about sculptural scenery.' He was able to do this by making use of the Olivier's five storey drum revolve.²⁹ The machinery had not functioned since it was installed. Dudley discovered by chance that the National Theatre engineers had got it working. In the canteen, two house engineers overheard him say what a shame it was that the drum revolve was out of commission:

Engineer: What do you mean?
It works perfectly.

Dudley: Any fool knows it doesn't work.

Engineer We've worked on it for the last five years and got it working again.

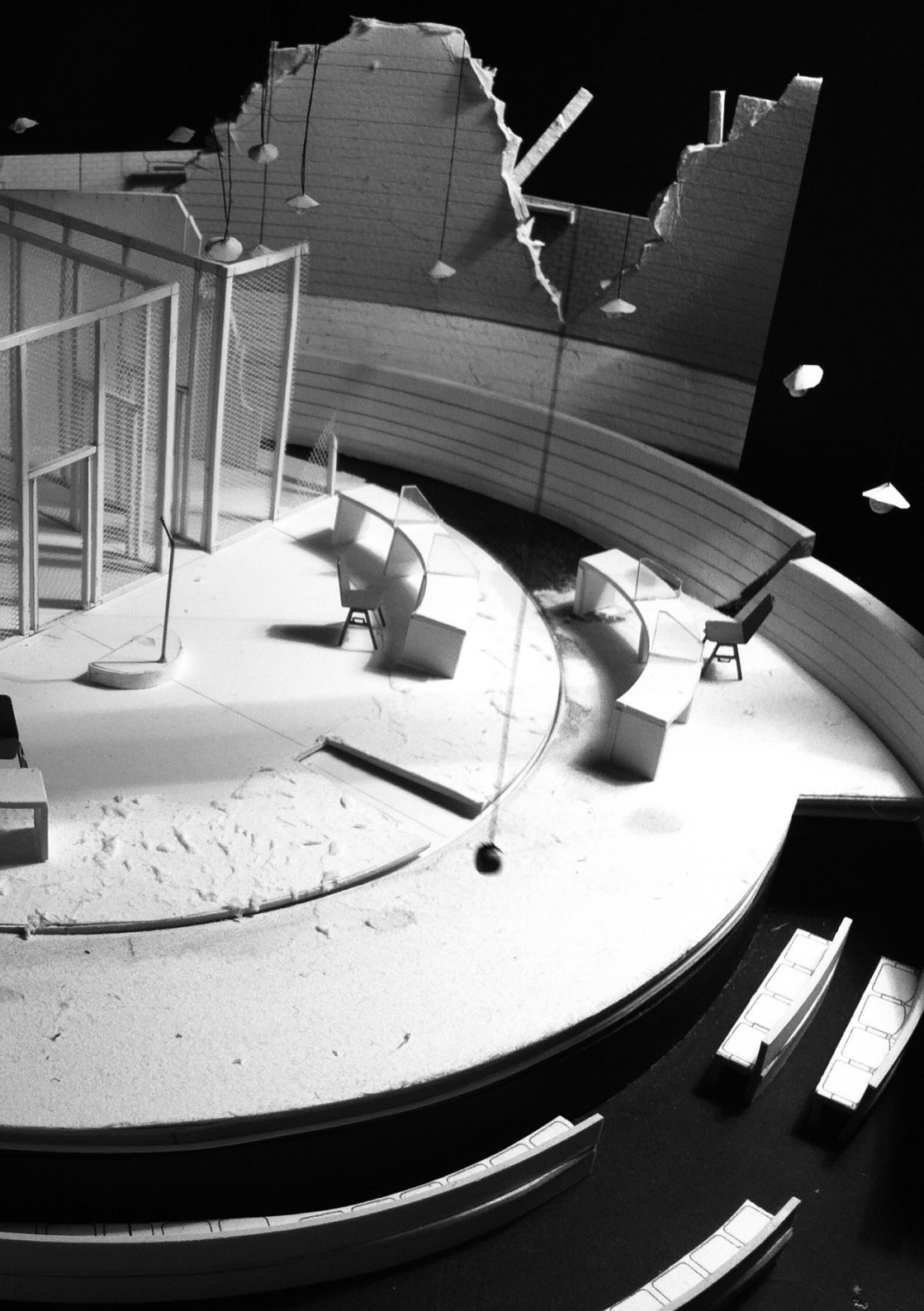
Dudley: Really?

Engineer: Yes, but we didn't want to tell anyone in case they used it.

Dudley: I won't tell a soul, but could you show me?³⁰

Combined with its elevators, the revolve could bring sets corkscrewing into view. Dudley describes this as 'the most beautiful movement ... like a DNA spiral'.

Reviewer Lindsay Cook delighted in the transformations of the settings in *The Shaughraun*: 'William Dudley's constantly mobile set, rising up and down and revolving like a fairground ride – one minute a windblown cliff top, the next the dark interior of a castle, then the outside of a cottage, then the interior [...] is one of the best jokes of the evening. As the melodrama becomes more and more preposterous, so the set gets increasingly agitated, bucking and wheeling, transforming itself from one location to the next.'³¹



***The Comedy of Errors* (2011)**

by William Shakespeare, directed by Dominic Cooke.

Set and costumes designed by Bunny Christie.

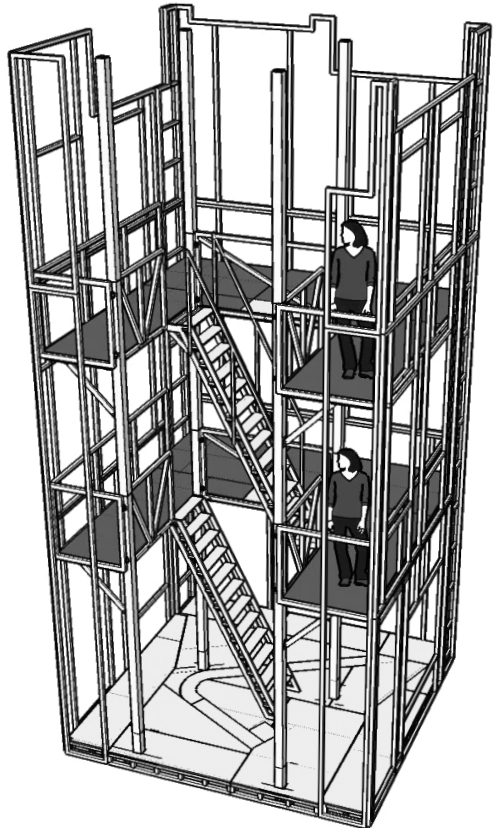
Model made by Verity Sadler and Ellen Nabarro.

*Dromio: We came into the world like
brother and brother And now let's go
hand in hand, not one before another.*

– The Comedy of Errors

The two tall buildings in Bunny Christie's design for *The Comedy of Errors* are a physical echo of the twins in the play: separate but mirrors of each other, with hidden aspects that are gradually revealed through the play. The opening scene is set on a dark, grimy dockside, with 'towering skeletal buildings festooned with iron walkways', as reviewer Susannah Clapp described it. As Egeon tells the story of the shipwreck that parted his twin sons, and how their ship cracked in two, the buildings also split apart.³² They rotate to reveal different faces, the two blocks now forming opposite sides of a narrow city centre street, with shopfronts marked with neon signs and passageways leading up to the flats above. Later, they rotate again to show the facades of Georgian houses clad in stone; a third tower slides forward into the space between them - the grand entrance to the 'Abbey Clinic'. This reverse side of this third tower is Adriana's apartment in 'the Phoenix', with a frontage of glass and concrete balconies.

Bunny Christie comments that the collaboration with Igor, the production manager, was crucial in planning how to engineer and orchestrate the moving scenery of this kinetic design. The towers were later used as part of the temporary 'Props Store' bar, on the riverside in front of the National Theatre.



Technical drawing for tower in *Comedy of Errors*.
National Theatre Digital Drawing department.

***Antigone* (2012) Sophocles, in a 1986 translation by Don Taylor, directed by Polly Findlay.**

Set and costumes designed by Soutra Gilmour.

Model made by Katie Lias and Aaron Marsden

and restored for the exhibition by Nina Patel-Grainger.

All my work endeavours to respond to the chosen space, in conversation with the text. In that sense it's always site-specific, whether I am in a found space, West End proscenium theatre or the Olivier. – **Soutra Gilmour**

At the first rehearsal of *Antigone*, designer Soutra Gilmour showed a model of the set: a military control centre with glass partitions and a huge shattered concrete wall behind it that revolves to become the city wall of Thebes. During the rehearsal period, the company made research trips to a 1950s nuclear bunker and the Churchill War Rooms, and watched films including *Dr Strangelove* (1964) with its massive concrete control room, and *The Lives of Others* (2006), set in the GDR of 1984. While noting the props and costumes of the period, the stacks of files in muted colours and reel-to-reel recorders, reviewers also picked up more contemporary references: there were echoes of Tony Blair's rhetorical style in Christopher Eccleston's performance as Creon, and in the opening image there was a reminder of Obama and Clinton watching the siege of Osama bin Laden's compound.

Antigone was the first show Gilmour designed in the Olivier, and it began a dialogue with the space that has been continued through her subsequent designs for *Les Blancs* (2016) and *Twelfth Night* (2017). She is interested in Lasdun's choice of materials and structures as embodying an egalitarian view of society and enabling direct conversation between actors and the audience. Noting that the Olivier's most powerful playing area is 'the downstage triangle between the outer sightlines and the centre of the drum', Gilmour says that sets can 'describe, hold and give dynamism to this energy'. *Les Blancs* used the revolve to move around the 'compass' of the circular stage,

while in *Twelfth Night*, the triangular playing area was built up vertically into a wedge-shaped staircase that opened like a book to reveal new locations.

Gilmour's most important discovery about the space was the uncovering of Lasdun's 'jaws', the low curved concrete walls that sit half on the stage and half in the auditorium: 'Often these are covered up in order to hang lights but they have a crucial role in bridging the threshold between stage and auditorium. Exposing them shrinks what can feel a huge space by visually pulling the stage into the audience's space. It becomes a shared space.'

***Exit the King* (2018)**
by Eugène Ionesco, in a new version
by and directed by Patrick Marber.
Designed by Anthony Ward;
model made by Luke Smith.

'The Throne Room, vaguely dilapidated, vaguely Gothic. In the centre of the stage, against the back wall, a few steps leading to the King's throne. On either side, downstage, two smaller thrones – those of the two Queens, his wives. Upstage left, a small door leading to the King's apartments. Upstage right, another small door. Also on the right, downstage, a large door. Between these two doors, a Gothic window.'

Stage directions from *Exit the King*, translated by Donald Watson.

In Anthony Ward's design, the actors are brought close to the audience by placing the whole set on the front half of the revolve. Characters pop out of doors and windows at different levels in the monumental back wall, split by a vertical crack. A red carpet runs right down the centre aisle of the auditorium, linking stage and audience. The Queen further blurs any distinction between the two spaces by indicating that the members of the audience should all stand up when King Berenger the First arrives, stumbling down the red carpet. At the end of the play, as the cracks in the back wall open up, it splits into four pieces. Some of the wall flies upwards, but most of it sinks down on the elevator, along with the stage floor. The red carpet, and the throne standing on it, are suspended above the abyss as the throne slowly glides backwards into the darkness.

If Ionesco's opening stage directions for *Exit the King* seem quite prescriptive, his final image of the set disappearing entirely seems to be written for a theatre that didn't yet exist in 1962.³³ Using the machinery of the Olivier, Anthony Ward was able to make the back wall and floor literally disappear. A bridge across the void supported the narrow red line of

carpet as the throne slid back into the space beyond the usual playing area, beyond the back shutter.

Anthony Ward worked with his assistant Luke Smith on *Exit the King*, creating dozens of models at different levels of detail as the design evolved over a year. Karen Moon challenges the view of the model-maker in architecture as simply 'following instructions': 'show a good model-maker a drawing and he will show you the design problems. He questions everything because he is forced to answer everything.'³⁴ The collaboration between designer and model-maker is also a dialogue with materials. Ward says a significant shift in the design occurred when Smith suggested modelling in plaster rather than card: 'suddenly I had something I loved: a sculptural curve'. At the next stage, the technique of transferring images to plaster helped develop a weathered look for the heraldic image on the back wall – showing how materials can make their own propositions to the designer.³⁵

A white card model following a meeting,
showing annotations in pencil.
Photograph: Anthony Ward





Models for *Antony & Cleopatra*.
Photographs by James Bellorini

***Antony & Cleopatra* (2018)**

directed by Simon Godwin.

Set designed by Hildegard Bechtler.

Model made by Patrick Cahill.

For *Antony & Cleopatra*, the proportions of the Oliver were altered: the back shutter was left open, and Hildegard Bechtler also added a black panel to reduce the height above the stage, hiding the lighting rig. Together these changes made the playing space deeper and lower. Bechtler and director Simon Godwin sought to create distinct, contemporary worlds for Egypt and Rome, and to move rapidly between the play's many locations. One side of a large structural wall represented Egypt – with textured tiles glazed in vivid turquoise, a pool and sun loungers. The reverse side represented Rome – with dark polished marble and a giant video screen. The drum's elevator was used to exchange scenery smoothly, but members of the company also shifted walls during a battle, evoking the confusion of shifting perspectives as combatants ran through narrow streets.

An early 'white card' version of the party on board Pompey's ship was an enclosed room that would rise out of the stage on the drum. There were both technical and aesthetic concerns about how it would work. Hildegard Bechtler recalls, 'when Simon and I showed it to actor Ralph Fiennes, he responded to the simpler design for other scenes, and that pushed me to rethink the ship. I came up with a wall that turns as it rises, so you see the exterior of the hull first, then it revolves to show the interior.' The curved hull was made of wood painted to look like grey steel, with a hatch door. With its compound angles, and a requirement to be self-supporting because it would be viewed on both sides, the hull was tricky to engineer and construct. In the production, part of the set drops away, leaving a terrifying void open in the floor through the following scene until the ship spirals into view like a shark's fin slicing through water.

Hildegard Bechtler is renowned for the accuracy and detail of her final models. Yet it is the experimentation made possible by the model that she most values:

'The model is part of the journey with the director – it helps to decide which road you want to go down. It's a place to experiment and dream without the anxiety and pressure of the real thing. Experimentation is crucial, and takes place almost to the end of the process. Only physical models let you bring real materials – wood, canvas, brass – into the space. It's a painterly approach: even a purely architectural set works through texture and the model gives so much back.'

Epilogue

'For now we know, everything moves'
– *Galileo*

In Fly Davies' design for *Pericles* in August 2018, a simple grey ramp followed the curve of the revolve, echoing the concrete 'jaws' that link the stage and auditorium. A small professional cast was joined by a huge and diverse company of non-professional performers from London community groups, as well as dance groups and choirs.³⁶ In the concluding scene, over 200 performers filled the stage, pouring through the open shutters from the scene docks at the back, filling a balcony across the back wall and stepping into the auditorium to line its walls as they sang. The effect was to recreate the Olivier as a civic space – one in which the audience sees itself reflected on stage. Professor Helen Nicholson, who followed the project as a researcher, reflected that although she had seen a lot of shows in the Olivier she had never before 'felt such a connection between audience and performers'. She suggests that this production raises a new question for participatory theatre: not so much how can the theatre change the lives of community participants, but how do companies like that of *Pericles* change the theatre?³⁷

The kinetic nature of the Olivier does not reside only in its machinery or the ingeniously constructed sets that allow rapid transformations and relocations. It lies also in the performers' relationship with the audience, the long distances they need to cover from the wings to the central playing area, the sense that the dynamic triangle running from the centre of the drum to the perimeter is, as Soutra Gilmour puts it, a quivering needle on the face of a compass. The set model is both a means of collaborating and a speculative tool for thinking in three dimensions and with materials, zooming in and out of the human scale.

Eleanor Margolies

Margolies is a Jocelyn Herbert Fellow of Camberwell, Chelsea and Wimbledon Graduate School, University of the Arts London. This essay draws on conversations with Anna Anderson, Hildegard Bechtler, Lizzie Clachan, Soutra Gilmour, Adam Nee, Geoffrey Scott, Tina Bicât and Anthony Ward – with thanks to them and all the designers who gave permission for their work to be included.

Jocelyn Herbert (1917 – 2003)

Herbert studied painting in Paris with André Lhote, and scene painting with Vladimir Polunin at the Slade. In 1936, she joined the London Theatre Studio, where she studied theatre design with the trio of designers known collectively as 'Motley'. Herbert married and brought up her four children before returning to work in theatre in 1956. At the Royal Court Theatre, she designed the first British productions of plays including *The Chairs* and *The Lesson* (Eugène Ionesco, 1957, 1958); *Krapp's Last Tape* and *Happy Days* (Samuel Beckett, 1958, 1962); *The Kitchen* and *Roots* (Arnold Wesker, 1959, 1960), *The Sport of My Mad Mother* (Ann Jellicoe, 1958); and *Serjeant Musgrave's Dance* (John Arden, 1959). She developed long-standing professional relationships with the playwrights Samuel Beckett, David Storey and Tony Harrison, and with directors including Tony Richardson, Lindsay Anderson and John Dexter.

The Jocelyn Herbert Archive is held in the National Theatre Archive nationaltheatre.org.uk/archive.

The 'Playing with Scale' exhibition is the outcome of the Jocelyn Herbert Fellowship (2016-18) and forms part of a collaboration between the National Theatre and Camberwell, Chelsea and Wimbledon. The exhibition is funded in part by the Rootstein Hopkins Foundation.

Notes

- ¹ Christoph Grafe introduction to *Models of Concern: A selection of interior models* ed. G. Schrofer, C. Grafe, I. de Roode (Amsterdam, Architectura & Natura, 2008).
- ² Rachel Hann, *Beyond Scenography* (Abingdon, Routledge, 2018). Hann emphasises that the term 'scenography' is not a synonym for 'set design' but a way of thinking about how theatre manifests in time.
- ³ This comment, and other unattributed quotations in the following paragraphs, are drawn from interviews which have informed the whole essay. My thanks to all those who spoke to me.
- ⁴ David Neat, 'Why Make Models?' in *Blue Pages* (The Society of British Theatre Designers, vol. 4 2009).
- ⁵ Asif Khan writes that he asks students to create studies using photography, collage and scaled human figures to explore the world around them, at 50 times their own size down to 500 times smaller than life-size. Through this process they discover that 'things they previously knew as familiar contain remarkable textures, layers, structures, optics, unknown depths which can release Architectural ideas which we never imagined before'. www.instagram.com/p/BpHXh7IBUf1/?hl=en&taken-by=designmuseum
- ⁶ Karen Moon, *Modelling Messages: The Architect and the Model* (New York: Monacelli Press, 2005), p. 47.
- ⁷ Johannes Schütz in *Models & Interviews 2002-2016* (Berlin: Hatje Cantz, 2016), p. 174.
- ⁸ In 'The Knacker's Yard' project, Aldona Cunningham and Joanna Parker brought together thousands of 1:25 model pieces from the personal archives or studio shelves of theatre designers: 'All the objects had some form of significant history, or the designers' artistic or autobiographical preoccupations, inscribed in the material of their making'. Through improvisatory play, sometimes to music, with objects made by different hands, for very different productions, they provoked new creative encounters. Joanna Parker 'To be inhabited spaces' in *Theatre Materials* ed. E. Margolies (London, Central School of Speech and Drama, 2009), p.62.
- ⁹ Quoted in Alistair Fair, *Modern Playhouses: An Architectural History of Britain's New Theatres, 1945-1985* (Oxford, Oxford University Press, 2018) p.185.
- ¹⁰ Barnabas Calder, *Raw Concrete: The Beauty of Brutalism* (London, William Heinemann, 2016), pp. 293-4.
- ¹¹ Minutes of the Building Committee 1964, quoted in Calder, p. 374.
- ¹² *ibid.* p. 291.
- ¹³ Letter in the Jocelyn Herbert Archive, held by the National Theatre Archive JH/12/6/1.
- ¹⁴ The Barbican theatre was designed for and with the Royal Shakespeare Company by Chamberlin, Powell and Bon, and is of the same size as the Olivier (1156 and 1150 seats respectively). The most significant overlap between the two projects was in the person of Peter Hall, who founded the RSC in 1960 and became Director of the National Theatre in 1973.
- ¹⁵ JH/12/6/1.
- ¹⁶ *ibid.*
- ¹⁷ Alistair Fair, *Modern Playhouses*, p. 185.
- ¹⁸ JH/2/53/14.
- ¹⁹ An account of this can be found in Jim Hiley, *Theatre at Work: The story of the National Theatre's production of Brecht's Galileo* (London, Routledge & Kegan Paul, 1981), p. 28 and *passim*. Hiley traces the production from early planning to first night, describing how the design was realised in the construction and prop-making workshops.
- ²⁰ JHA 2/55/2.
- ²¹ Review by Charles Spencer, *The Surrey Advertiser*, 7 October 1977.
- ²² Comments made as part of 'Jocelyn Herbert at the National', Platform discussion on 7 April 2004. National Theatre Archive RNT/PL/3/802.
- ²³ Hiley, *Theatre at Work*, p. 225.
- ²⁴ Cathy Courtney, *Jocelyn Herbert: A Theatre Workbook* (London, Art Books International, 1993) p.215.
- ²⁵ Courtney, pp. 112-7.
- ²⁶ 'Third Ear', BBC Radio 3, 2 March 1992. Archived at the British Library B9121/3.
- ²⁷ Hiley, p. 78.
- ²⁸ This and subsequent quotations from William Dudley are taken from 'Outsider's View' by Nick Martin in *Plays International* (undated) pp. 18-20.
- ²⁹ Designed by Richard Pilbrow and Richard Brett of Theatre Projects, the 'drum revolve' beneath the Olivier stage is made up of four elements that can be used independently or together: the cylindrical drum, a flat rim that surrounds it at stage level, and two semi-circular elevators known as Red and Blue. The whole drum can revolve, turning a disc at the centre of the stage floor. The surrounding rim can turn independently – at a different speed or in the opposite direction to the drum. The Red and Blue elevators can rise and fall separately through five storeys. By coordinating a rising elevator with the turning revolve, a scene can be made to 'corkscrew' up into view.
- ³⁰ Daniel Rosenthal, *The National Theatre Story* (London, Oberon, 2013), p.436.
- ³¹ Lindsay Cook, *The Yorkshire Post* 17 May 1988.
- ³² Susannah Clapp's Observer review is reprinted in *Theatre Record*, 19 November – 2 December 2011.
- ³³ Jocelyn Herbert's design for the 1963 production at the Royal Court placed the king's throne on a revolving pedestal that allowed it to disappear and made use of the theatre's star traps. See Courtney, *Jocelyn Herbert: A Theatre Workbook*, p. 57.
- ³⁴ Moon, *Modelling Messages*, p. 139.
- ³⁵ Anthony Ward speaking at the 'Designing Exit the King' discussion at the National Theatre, 3 October 2018.
- ³⁶ Filling the Olivier for just three performances in August 2018, *Pericles* by William Shakespeare in a version by Chris Bush, directed by Emily Lim, with music by Jim Fortune was the first of the National Theatre's 'Public Acts' participatory theatre projects.
- ³⁷ Comments edited with permission from Helen Nicholson's tweets @HelenNicholson2.

Thinking In 3D: Scale Models For The Olivier Theatre

Eleanor Margolies

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