WIND IN THE WILLOWS

Catriona Forcer and Ben Duncan take a look at the technical artistry behind the National Theatre production

The rotating and rising drum revolve stage showing the interior of Ratty's House.

The majority of the shows produced by the Royal National Theatre are for adults, so the decision to stage Kenneth Grahame's 'The Wind in the Willows' was quite unusual. The book itself was ideal for the purpose, being a gentle tale, well known by everyone. Alan Bennett was commissioned to do the adaptation taken from the original book.

Nicholas Hytner was appointed as director and he subsequently contracted Mark Thompson as his designer. Together they spent several weeks working on the concept and construction of models before being joined by Andy Peat, production manager.

The show was to be staged at the Olivier Theatre making full use of its rotating and rising drum revolve stage which, 11 metres in diameter and weighing 80 tonnes, is the largest of its kind in Europe. The elevator was to be used for the three interiors — Ratty's house, Badger's house and Mole's house. It was also established very early on that a rim revolve would be needed to accommodate either a river or a road, two key elements in the play.

"Mark Thompson came up with various designs," explained Andy Peat. "The overriding factor he had to work towards was the weight restriction of the elevator — you can't just load as much as you like onto the elevator. There is a limit of 3½ tonnes which is not a great deal when you want to build a big scenic structure. The first drum model had to be abandoned because it was on three levels and there was no way it could have been built to three tonnes. Then Mark came up with the current proposal which is the same shell with three different interiors."

A scale model was constructed but while it revealed the concepts, it didn't define the precise dimensions or method of construction. A number of staging construction specialists decided that the job was not for them due to the difficulties enforced by the weight limitation. Eventually the task was taken on by Total Fabrication Ltd, a company recently acquired by Light & Sound Design of Birmingham.

"Because of the weight problem I gave Total Fabrication a weight limit of 2 tonnes," said Andy Peat. "They had that to work to and P.L. Parsons, scenery makers, had a 1 ton limit. Obviously I wouldn't be doing my job very well if I didn't have a bit tucked up my sleeve that they didn't know about! To a certain extent they are experienced enough to know I keep something tucked away. I left about 2-300 kilogrammes up my sleeve because I knew all the contractors would slightly overrun on their weight calculations.

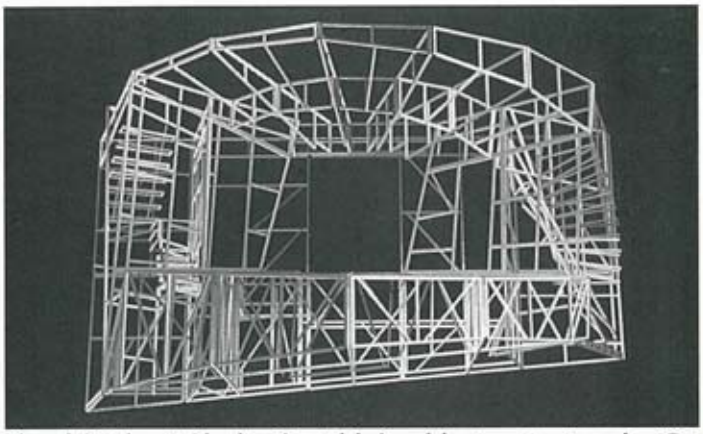
"Various other things had to be taken into consideration, one of them being that on any shape that size there's going to be a little flex and movement; added to the fact that the elevator is counter weighted and any counter weight system will have a slight bit of movement on it. I had to decide how much to reduce the whole semi-circular structure by, and it was agreed to take 50mm off the front and back and 50mm off each side so it was basically shrunk by about 1½%. As a result, when the structure moved up and down, any slight side to side movement was contained within the drum."

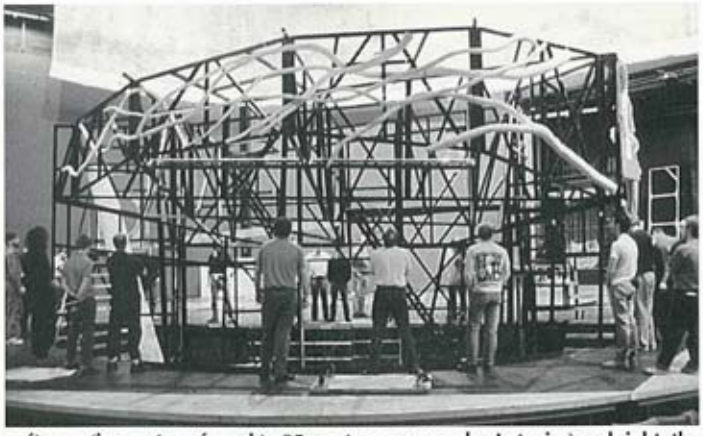
Chris Cronin, managing director of Total Fabrication, decided that the only way the set could be constructed was by Computer Aided Design which is not exactly a first for theatre, but it is the first time that it has been used to such an extent. Chris employed the skills of 3D Auto-CAD designer and programmer Adam Maitland, and his company CADenza. CADenza's expertise with 3D Auto-CAD proved its worth right from the beginning when a latent 'fatal error' concealed in the scale model, was uncovered.

"We found out from the National Theatre what scenery services were needed and where they were to go," Adam elaborated. "I then had to come up with a structure light enough to hold all this, but tensile enough to keep in place as it travels up and down, and round. Technically, we were working backwards, I suppose. You put the wallpaper up and then you attach the walls. There isn't really a straight edge anywhere in it and, what's more, if you place weight, people for instance, on top, some of the structure tends to tilt. Visually it's designed to vanishing point perspective, but engineering wise it's a nightmare. It needed a lot of cantilevered beams along the top to transfer the weight onto the back wall which is straight. I'm glad to say it's been a success because the only place the whole structure flexes now, if you put people on top, is along the back floor. It means we've managed to transfer all the weight through the structure so it only lives on the bottom, and you can't beat gravity. From an engineering point of view we've done the job and achieved, hopefully, the improbable."

"Time was very short," added Chris Cronin. "We started the work in early October and the brief was to have it ready for the scenery people by November 1st. We actually turned up with it on November 2nd! But, having said that, the job grew considerably and developed dramatically from the original plans. Although we were officially a day late, we were essentially early on what was finally asked of us."

To produce plans accurate to a fraction of a





Above left, Adam Maitland's animated design of the stage structure using 3D studio software (image transferred to 35mm transparency by Autocim) and right, the end product installed at the National Theatre.

millimetre, Adam wrote a custom routine in a computer language Lisp to check and verify the planes each member connects to, and enter it into the 3D mesh. To meet the tight deadlines, Adam Maitland's finished plans were immediately relayed by modem to Total Fabrications' premises in the Cotswolds. There a second Auto-CAD station revealed CADenza's progress and Chris Cronin then made additions and changes of his own. The result was that component parts of the structure were approved and on their way for assembly within 24 hours of the plans emerging from CADenza.

"In comparison, working with traditional drawing boards and a team of draughtsmen would have taken months," explained Adam Maitland. "Also it's a lot easier to modify a model on computer rather than having a draughtsman start all over again."

Adam Maitland subsequently animated the design using 3D Studio, AudioDesk's new software, which CADenza is beta-testing before public release later this year. This enabled Olivier Theatre's production team to see the stage movements and even a simulation of the lighting.

Once Chris Cronin delivered the aluminium structure it was assembled at the workshop of P.L. Parsons — one of the largest in London. It was their job to clad the structure as well as manufacture the stairwell coverings, the floor coverings, together with the ceiling and access doors. They also constructed the flown and standing trees. The scenic mounds and greenery above the stage were built by Cardiff Theatrical Services, the scenery making division of the Welsh National Opera. The National Theatre's own paint shop painted the flown and stage cloths, whilst the prop department made the car, train and caravan. There was only one company that Andy Peat was prepared to use for the rim revolve and that was Peter Kemp Engineering.

"You have to bear in mind that all the cladding, roofing, flooring and decking of the entire structure could not be constructed in the usual material of timber because it would be too heavy," explained Andy Peat. "Instead a lot of lightweight and extremely expensive covering called Aerolamb was used. It's like a honeycomb beard covered in either aluminium or fibre glass. All the flooring and staircases are aluminium Aerolamb, whilst the ceiling is twin wall Macrelen. The whole of the roof is made from 25mm fibre glass Aerolamb.

"Throughout the project an eye has to be kept on the weight. After the close of the show in June 1991, the whole structure will be dismantled, so the whole thing has to come apart. Everything has had to be blocked or pinned together, whereas normally it would be glued or welded."

Once the mound was established it was shaped, carpet felted and then covered with custom-made canvasses which were then painted. The root work on the main structure would normally have been made of fibre glass, but that would have proved too heavy. A simple solution was to make them out of steel rods bent to the required shape. These were then bandaged in foam, covered in muslin and then textured with a paint called Idendon. Everything on stage had to be fireproofed, particularly as the Olivier Theatre does not have a safety curtain, and that limits the materials that can be used. Consequently a lot of the materials specified are not normally to be found in the theatre and the suppliers are not accustomed to next day delivery. As a consequence, Andy Peat found himself buying his way up the queue.

The table, barge and Toad Hall were all built and painted by Streeter and Jessel Ltd. The table is 7m long and has to fly in on its side, whilst the barge has to be able to split in two because of its size. Besides making the large props, the National Theatre's prop department also had to sort out the furniture and the dressing for the three interiors, a lot of which had to be made in perspective. Liz Ainsley was responsible for buying all the hand props from antique shops and auctions to fit the turn of the century.

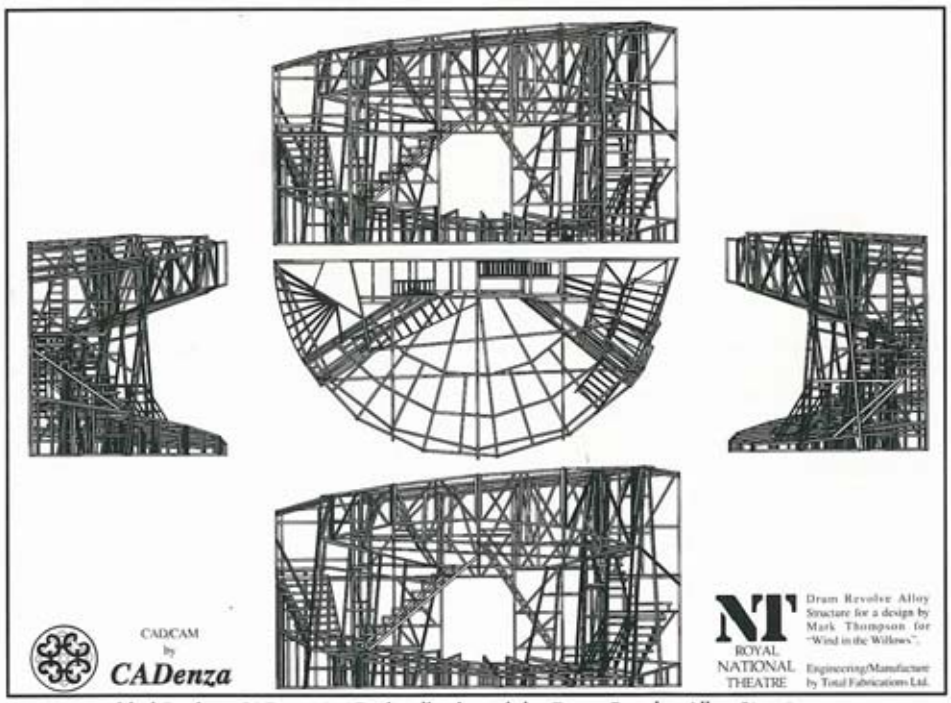
The lighting designer for 'The Wind in the Willows' is Paul Pyant who, since 1974, has been mainly associated with Glyndebourne. Last year, he was nominated for a Tony for Best Lighting on the Broadway production of 'Orpheus Descending'.

"This is my fifth show for the National and my first in the Olivier Theatre which is a very daunting space to light. Mark Thompson has designed on every square inch of it which, of course, isn't necessarily meant to be lit. It's been the age old chestnut of making a little go a long way as effectively as possible," Pyant explained. "The Olivier has a large, basic repertoire rig consisting of almost 1000 lamps, it sounds fantastic but in fact it isn't. Of those, 800 are always locked on permanent focus. As the show is in rep with other productions the stage needs to be divided into permanent focus to facilitate the incredibly short turn around times. Change over has to be about four hours but that's impossible with 'The Wind in the Willows' which is taking about eight hours. I've been able to rig about two dozen special lamps and I've recoloured a lot of the rig, but not everything. Basically we're talking about minimal refocus between the two shows. It's difficult to get a show this size, which is much bigger and more complex than they normally have here, out of the repertoire rig. You have to be very economic.

"You also have to remember that the show is now in rep with Racing Demons and The Crucible but it plays until June, by which time there will be three new productions in rep with it at the Olivier. It has got to be compatible with all of them.

"As far as the artistic input of the show goes we've drawn all the images from the watercolour drawings of E.H. Shepard who illustrated the original 'Wind in the Willows'. We're trying to portray that nostalgic, English watercolour feeling. We do the whole gambit of spring, summer, autumn, winter and we also do the morning, noon and night of each season, sometimes over a matter of just 15 seconds.

"One major problem was getting power and lights within the drum revolve itself. We've had to feed about 12 circuits to the structure, by



Computer Aided Design: CADenza's 3D visualisation of the Drum Revolve Alloy Structure.

various means, to make the interiors. The rim revolve has to change from a river to a road by means of David Hersey KK wheels with various gobos. It then becomes a railway and we've made up a set of slides for projectors to make a railway track. There are also the more common effects like snow projectors.

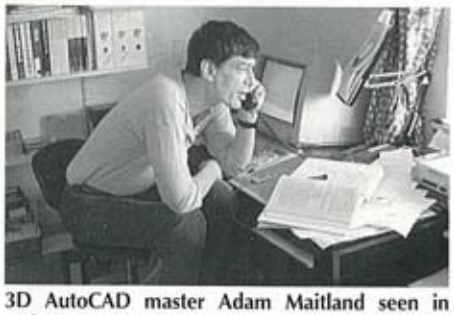
"The Olivier has a Galaxy 3 control desk which I'm very fond of, as a control system it's one thing that Rank Strand have got right because they have years of experience backing them. There are other theatres that will use more rock type boards, but I don't get on well with them. I think it's got to the point now where the control systems are too sophisticated and you need so much more time to programme them. Really, what they are controlling tends to be rather crude as it's only a light bulb, and there is very little intelligent light source. I'd love to have the sort of lights you get on a rock rig but you couldn't possibly work it in this system because of the amount of maintenance and expertise required. They are not 100% reliable which is something we depend on.

"Here at the Olivier we have enough problems with the 125 colour changers which tend to stick a lot. It's not the theatre's fault as it's a question of money. They have had almost a complete refit in the last three years and there is a huge mixture of lamps from ADB to Rank Strand to Silhouette. It represents a vast capital outlay and, simply because there is very little time in a week and electricians are expensive, there is limited time to maintain or overhaul equipment.

"This has been a huge challenge. It took a lot of working out and a lot of rehearsing. I was in rehearsals from almost day one which is a huge luxury. I can't afford to do it too often because lighting designers are paid so abysmally. You have to do so much to earn a decent living. Scenic designers would be working hard if they did five shows a year. In 1989 I did 35 shows and this is my 21st for 1990. It means my input has to be, not as great, but in effect more concentrated."

A lot of the National Theatre's resources were channelled into this production of 'The Wind in the Willows' which is certainly much larger, both in physical and budgetary terms, than they are used to staging. Andy Peat's budget for the set and costumes alone was over £250,000. Fortunately the show is sold out until April 1991 and booking for May and June has not yet opened. Had the show been staged in the West End the fit up period would have been two weeks but, because the theatre cannot afford to close for that length of time, the team had two working days to set everything up for the first rehearsal. Technical rehearsals took about four days during which time, other technical work had to take place. The pressure on the staff and production team to physically build the set, put it up and get it working, was quite intense. The expertise and professionalism of the Olivier staff, particularly the production team of Andy Peat, Annie Gosney and Guy Nicholson, have ensured a truly marvellous staging of 'The Wind in the Willows'. Add to that a star studded cast, including Richard Briers (Ratty), Griff Rhys Jones (Toad), David Bamber (Mole) and Michael Bryant (Badger), and ingenious, breathtaking sets and it makes a show not to be missed — that is if you can get a ticket!

Catriona Forcer



3D AutoCAD master Adam Maitland seen in action.

The Olivier was the first theatre to be completed when the National Theatre opened in 1976. It's also the largest and has a thrust stage, with the audience seating extending around some 240 degrees. For all its valuable theatrical qualities, the lack of anything solid to mount speakers on over such a wide zone presents some recurring challenges to sound designers. The man in charge of sound on 'The Wind in the Willows' is Paul Groothuis ('Dutch' to his friends). He trained as a stage manager, then worked in a multitrack recording studio before going to the National in 1984. His team's responsibilities extend beyond performances; they have to look after all the communications systems throughout the theatre, including the CCTV. The need for continued maintenance stretches the already limited budget for sound, but as is the way in theatre, the sound crews' ingenuity works overtime to devise economic ways of implementing or jury-rigging any desired effect or improvement. Paul also makes savings by involving suppliers of equipment, rented gear and custom assemblies in forward planning, up to 18 months ahead.

Preparations

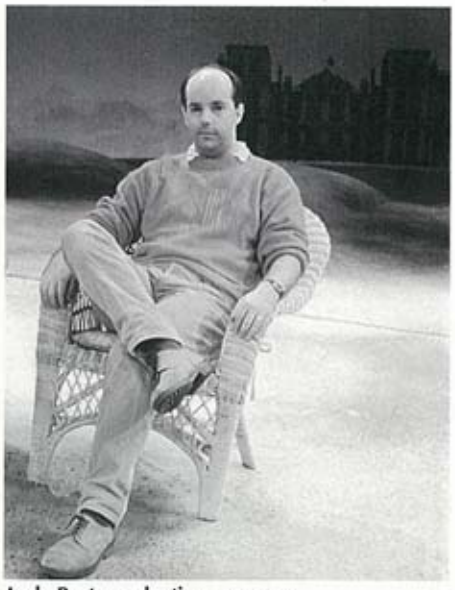
The sound production studio contains a Soundcraft 800B 24/8/2 mixer, Sentry III monitors, a Tascam 4 track reel-to-reel machine, and a stack of high-tech tools which includes a digital stereo tape machine kindly donated by Sony. Sound effects for 'The Wind in the Willows' were initially laid down and edited on a Steinberg Cu-base then assembled using a pair of Akai S-1000 samplers, with some help from an Akai MIDI trigger. Paul regards the S-1000 as a studio workhorse. He admits it takes time to 'get his head around it', but once the creative process starts, it saves not just time, but reels of tape. Working in the digital domain has also improved the quality of the end product, which is still a broadcast standard tape cartridge. Cart recording is via a Soniflex with dBx noise reduction.

Auditorium Sound

The mixing console operated by Freya Edwards, the No.1 sound operator, is a 32/10/10 Cadac with a 10 by 10 matrix. The name Cadac is primarily associated with upmarket recording studios. All the switchable functions (for example, routing, polarity, EQ in/out) are actuated by relays and controlled by an inbuilt computer. The mixer is actually a prototype that the manufacturer went on to successfully produce in quantity, although the onboard computer was abandoned in favour of hooking up to a PC. The Olivier's console is five years old. That's a long time for a theatre that works from morning to midnight 363 days a year, and it's a tribute to Cadac's engineering standards that it's still going strong, after over 2,000 performances.

During the performance, cart players are in the front line, as Paul feels it's too risky at the moment to rely primarily on a hard disc to cue live sound effects. And even a relatively large disc of 44MB only carries eight minutes of full-range sound, or 16 minutes if the hf is cut off at 10kHz. Nonetheless, there's an Akai S-1000 next to the cart machines, loaded with four key samples as a precautionary back-up.

Backstage, Jonathan Suffolk is the stage sound operator, responsible for the radio mics worn by nine musician rabbits, who appear at strategic points to play strings, brass, woodwind and accordian, considerably enriching the drama. The mics are Sennheiser MK2s, linked to Micron transmitters and diversity receivers. Some of the musicians have the mics on their foreheads, with the cable swept back over their head and woven into their hair. This prevents the mic snagging when they're called upon to make rapid changes of costume.



Andy Peat, production manager.

The PA is a mixture. Bose 101s are hung from the walls on either side at stalls level, while on each side of the seating mid-way up, are two EV S-200s. Hidden high amidst the lighting grid, there's a number of EV horns, supplied by Shuttlesound. Immediately behind the rotating stage, there's a pair of Turbosound TMS-2 cabinets. The backdrop curtain attenuates the high frequencies, so Paul Groothuis has placed two EV S-200 cabs alongside, driven by the high frequency side of the active crossover, to boost the output. A completely different PA enclosure rests further along. It's an elderly EV system, comprising a mid-sized 'W' Bin with two radial horns and four ST-350A tweeters on top. The associated power amplifiers are HIT, old HH's and Quad 501s. For deep bass needed for explosions, thunder and similar sound effects, there's a sealed enclosure containing a pair of 30" EV drivers, located in the 'Vomitorias', alias under the front row seating. The position is immaterial, as the source of the very low bass sound it creates can't be pinned down, as we shall see.

The props and stage fixtures for this production of 'The Wind in the Willows' are quite involved. The fixed speakers on and inside the rotating stage 'drum', like the cuckoo clock in the Badger's den are connected by audio slip rings, along with the comms and cue lights. The Toad's infamous motor car contains a 14" full-range speaker driven by a Kenwood car booster amplifier. A 'reverse' radio link (the opposite of the familiar radio mic system) conveys the sound effects to the vehicle. The railway locomotive has real brass pipes and levers. Inside are a pair of Bose 101s to make 'Jssh, Jssh' noises, again driven from a radio link, and powered by a Kenwood amplifier, for reliable operation from a 12 volt car battery. The solidity and realism of the car and railway engine's sound effects are aided by the sub-woofer discussed above. For example, the sub-bass cab provided the 'bumph' of the railway engine, but along with the rest of the audience, my ears were completely fooled, preferring to hear the whole sound come from the engine!

During the performance, the sound was to be uniformly high standard despite the mixture of different speakers and less than ideal locations. Sitting on the back row at the centre of the lower tier, my ears (and eyes) were taken in by all the sound effects, while the musical interludes were clear and without strain.

Ben Duncan

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- Wind in the Willows at the National
- Cliff Richard 'From A Distance'
- Tony Gottelier and Life Beyond DMX
- Ben Duncan Sounds Out the Eighties
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- Company reports: Samuelson/ADB/Playlight

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