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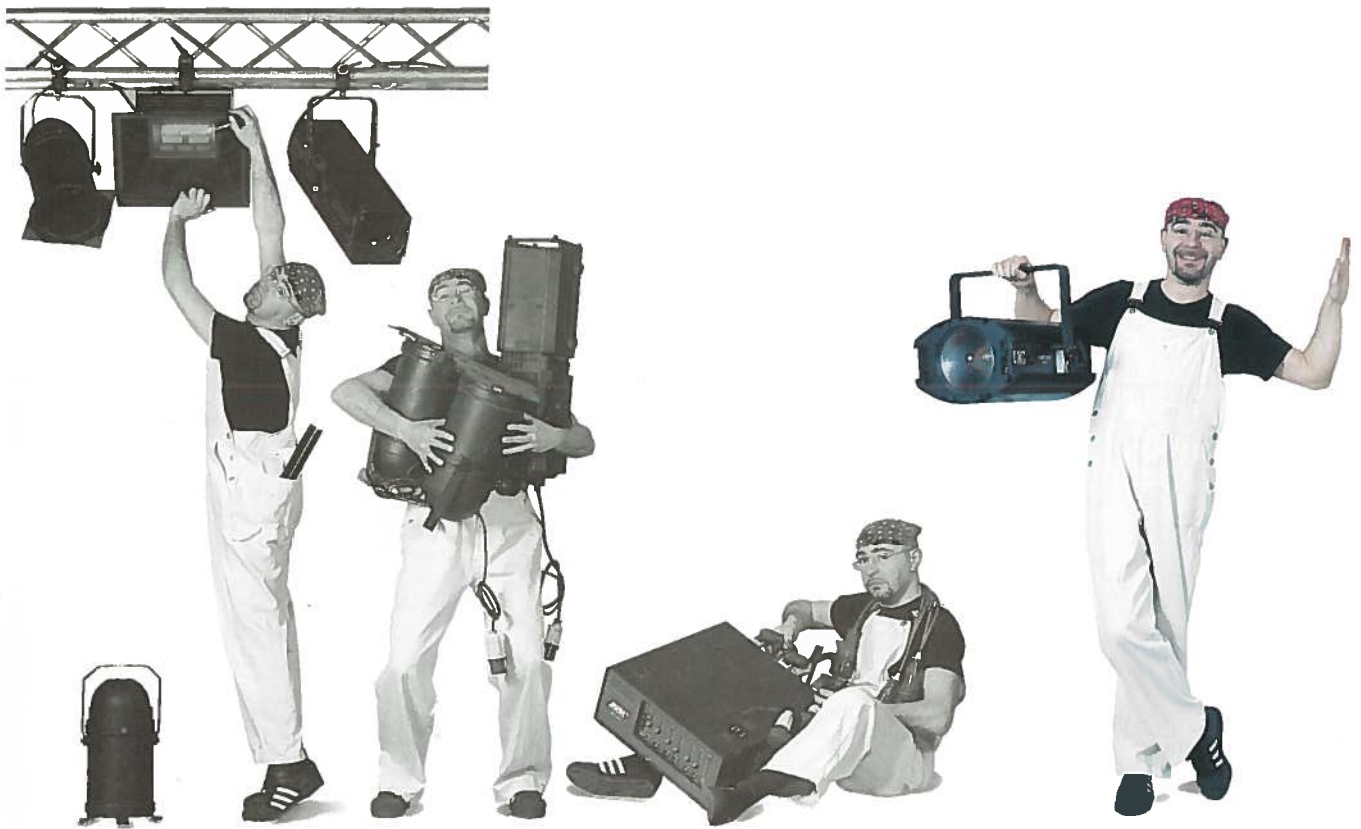
Gay PRIDE FESTIVAL, LONDON - SEE NEWS THIS MONTH

PHOTO: PAUL STANLEY

- Electronic Theatre Controls (ETC) sets its sights on worldwide control
- Ian Herbert reviews the Prague Quadriennale
- Days in the life of the Royal Opera House
- Richard Knight test drives Flying Pig's new Wholehog II
- Making waves with the QE2 refurbishment
- BBC on Centre Court at Wimbledon

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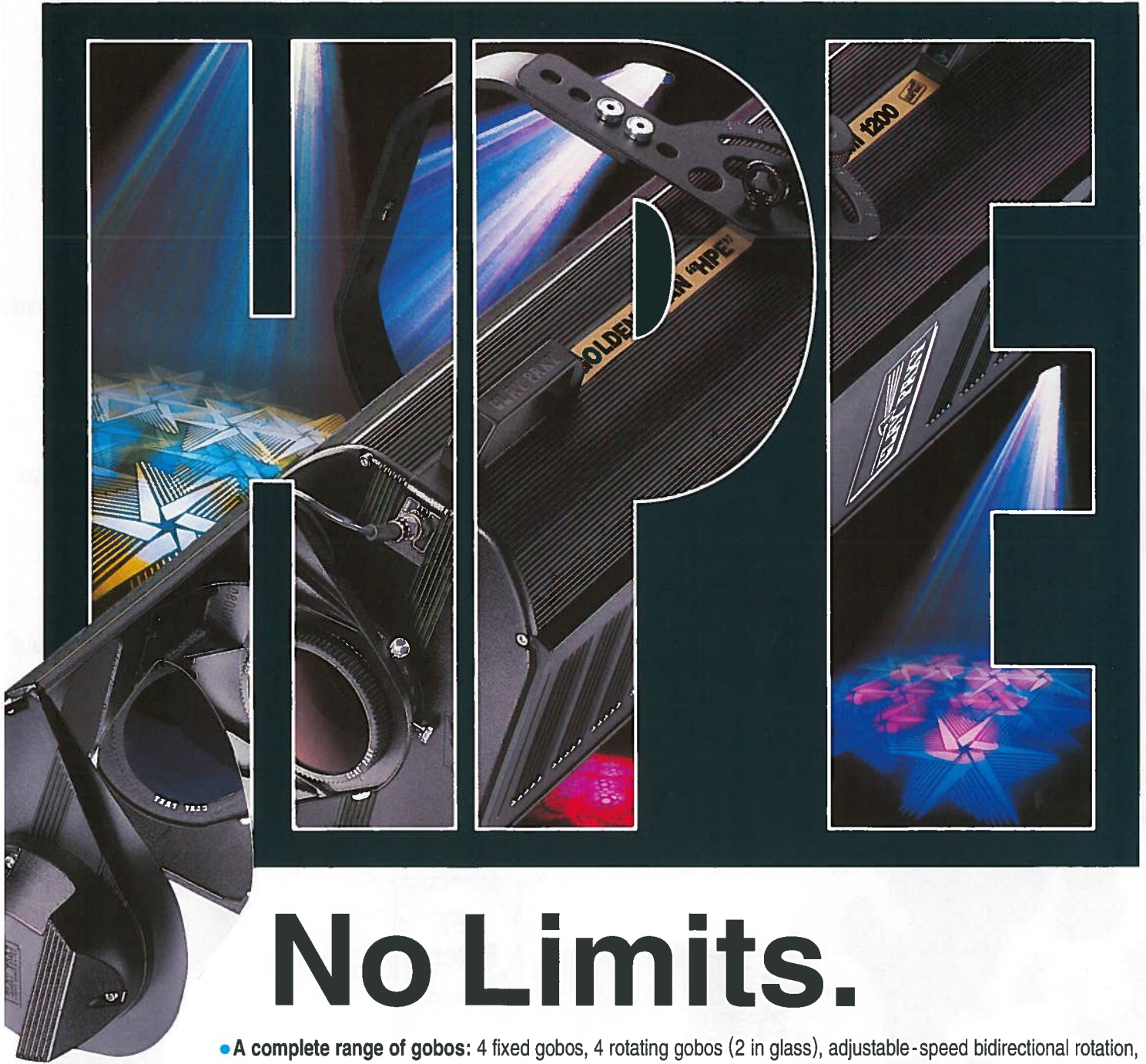


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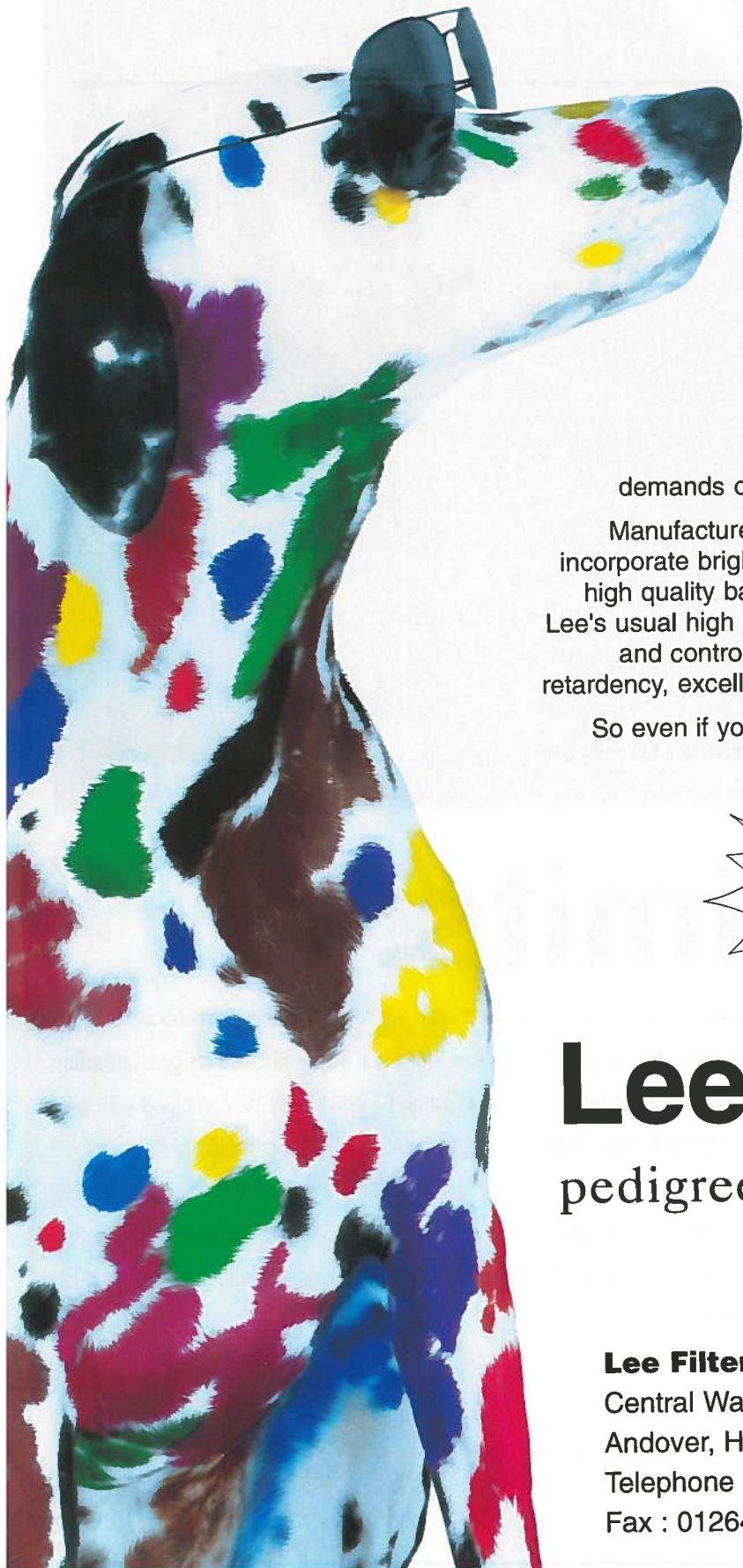


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AUGUST 1995

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United Kingdom Design Reg. No. 2029,499; 2033108.
German Utility Model Reg. No. G9312881.3 and G9314158.5.
All other worldwide patents granted or pending.

PLASA Show Seminars - leading professionals to participate

The PLASA Show will include a wide range of seminars with many of the top professionals in the industry involved. The keynote seminar on Monday 11th at 2.30pm is **Stage Lighting Design: New Directions? An Experiment**. Sponsored by L+SI, the session will be presented by Richard Pilbrow and will include Robert Bell, Brian Croft, Fred Foster, Philip Nye, Steve Terry, Chris Watts and Keny Whitright on the panel. The main themes will cover new instrument quality, touching on the silence and reliability of the latest colour scrollers and automated lights, and will examine both current and future programming and control techniques. Earlier in the day, a seminar conducted by lighting designers Francis Reid, Nick Hunt, Mark Henderson and Jackie Staines will discuss **Decisions on the Lighting Art**.

The afternoon will see a switch to sound: the Haydon Warren Memorial Lecture **A Watershed in Loudspeaker Design**, led by John Watkinson of the ISCE, will consider new approaches to design. This will be followed by **Acoustics - the Final Frontier**, chaired by Peter Mapp, who will discuss how room acoustics affect and degrade sound system performance. The last session of the day, **Speech Intelligibility as Design Criteria** run by Frans van den Meulen, will cover various aspects of audio engineering and sound system design.

On the morning of Tuesday 12th, part two of

the seminar on **Decisions on the Lighting Art** will be held with Hugh Vanstone, Paule Constable and Simon Calder on the panel. In the afternoon, Gareth Davis and David Dearden will present their **Mixing Console Update** - a review of console technology, applications and future developments, followed by Brian Copesey's seminar on **Radio Licensing Possibilities for the Entertainment Industry, UK and Europe**, which looks at how the ongoing changes in legislation are likely to expand the possibilities for the use of radio equipment. The final seminar of the day, **The Transformation from Old Ideas to Modern Technology**, will be given by Leon Pieters of AFILS, and will examine audio frequency induction loop systems.

Wednesday 13th sees the return of Richard Pilbrow, this time with Rick Fisher, Dawn Chiang and Philip Nye, to discuss **Stage Lighting Design: New Directions**. This will cover new instrument quality, the slowness programming moving lights, fixed lighting control and the future of moving light control. The last seminar of the show will see acousticians Peter Barnett and Ken Dibble chairing a seminar on **Occupational Noise**, which will be followed by an open discussion session.

Further information on the seminar programme at the Show, including times and venues, is fully detailed on the separate insert within this issue.

Teatro UK Opens

Mike Lowe, owner of Teatro Srl of Italy has registered Teatro (UK) Ltd. The principal role of the new company will be to support the Teatro dealers in their efforts to increase the sale of Teatro products in the important UK market.

Lowe added that Teatro Srl has a written agreement with all its UK dealers and that part of that agreement states that Teatro will not sell direct to the end-user, but will always involve the dealer in the sale of products. "By always honouring this undertaking, we have been able to build up an excellent rapport with our dealers, who will now benefit from some direct marketing assistance," explained Lowe. The new operation will get its official launch at the forthcoming PLASA Light & Sound Show where more details will be available on stand A196.

PLASA's Record High

All the signs indicate that a record-breaking PLASA Light & Sound Show will be taking place this year. P&O Events, the Show organisers, have signed up over 7,000sq.m of stand space, breaking the previous show-size record by over 1,000sq.m. In addition to the well established core of regular exhibitors, there will be over 50 companies new to the show this year, which will guarantee that a variety of innovative new products will be on display at Earls Court.

James Brooks-Ward, Show director, told L+SI: "This year PLASA is going to be bigger and better than ever before. The show size is up by over 17% and we have international exhibitors signed up from every continent. There is no doubt that the exhibition will be the centre stage for a high number of key product launches. The Show covers a breadth of product areas and is highly applicable to anyone involved in the light and sound industry, from club operators to live venue technicians, production companies, leisure facility designers and architects to DJs."

New exhibitors this year include Amek Systems and Audix Communications from the UK, Bytecrafft from Australia, Electronic Theatre Controls from the USA, flight case manufacturer Rufo Ans from Norway, Transtechnic from Germany and Walex from Hong Kong.

With less than six weeks to go to the Show, now is the time, if you haven't already done so, to ensure that you get your registration in. For more details on all aspects of the Show contact P&O Events in London, telephone 0171-370 8215.

PLASANET ON AIR

A continuous demonstration of PLASA's pages on the Internet will run throughout the four days of the PLASA Show. Visitors to the PLASA stand will be given a guided tour of the increasing amount of information already featured on PLASA's home pages.

All PLASA members are now listed, with several having hotlinks to their own World Wide Web sites. Alongside these are full details on the Show, the range of services offered by the Association, L+SI and S+CSI and other industry-relevant news.

PLASA's address on the Internet is <http://www.plasa.org.uk/plasa>

ETC Asia Launch



ETC Asia Ltd was launched at Pro Audio Light Asia in Singapore last month. At the show, director Jimmy Cheung announced that the company will install Obsession and Sensor dimming systems for two studios in Tibet, and three studios for Canton TV, China. ETC plans to offer service, training and warehousing facilities, and distributors are currently being appointed. Pictured above are Jimmy Cheung (left) and sales engineer David Ng. See ETC feature this issue.

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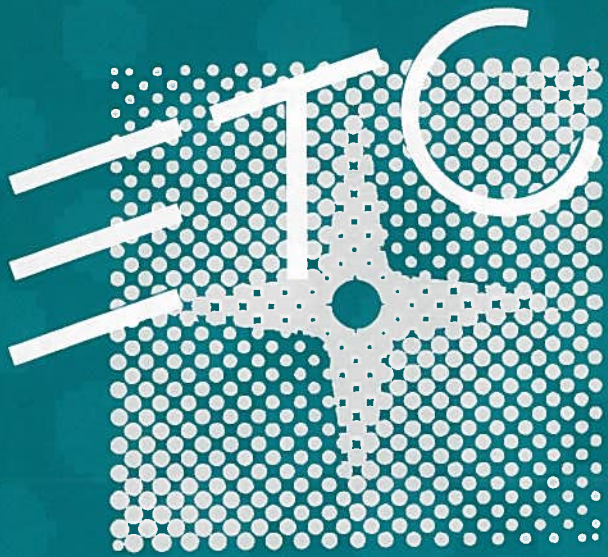
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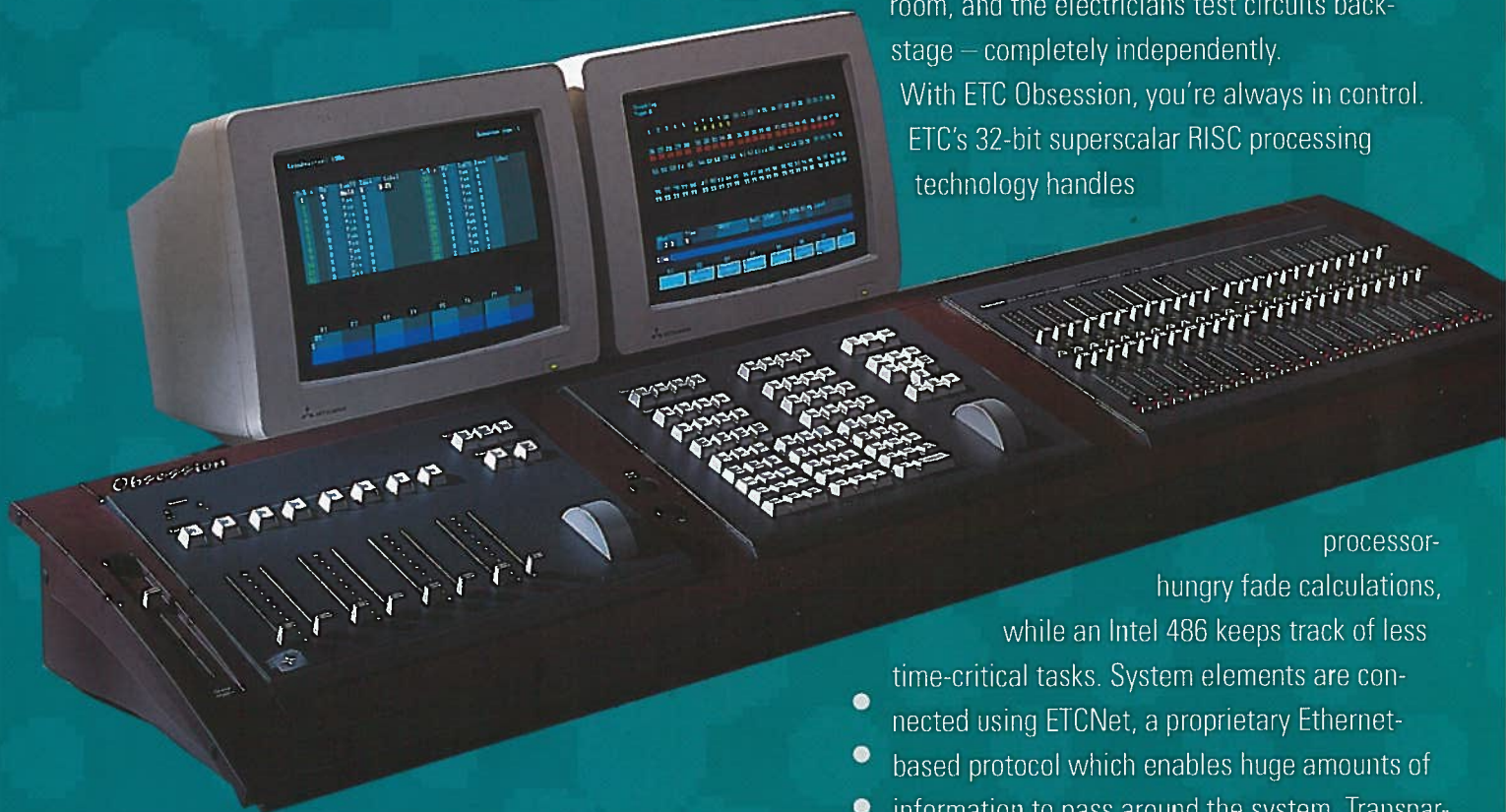
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PALA '95 Addresses Audio Broadcast



Anna Pillow and Nicola Evenden of PLASA, with Seet Choh Muar and David Drake of the British High Commission, Le Maitre's Rick Wilson and committee member Freddy Lloyd of Zero 88.

This year's Pro Audio & Light Asia '95 expanded into four halls at Singapore's World Trade Centre, to accommodate an enlarged showcase.

The show attracted more than 300 individual exhibitors, including two major national groups from Italy and the UK. Over 4512 visitors attended from 42 countries. This year's show saw an increased focus on audio broadcast technology, as a response to visitor demand at last year's show. Top industry names supporting the organisation of the new section included EAW, Mark IV Audio and Sony.

A strong British Group, sponsored by PLASA and the DTI, featured AC Lighting, AMS Neve, Allen & Heath, Cameron, Canon Audio, Garwood, HHB, Hz International, James Thomas, Le Maitre, Light Processor, McCormack Greig, Penn, Pulsar, SCV, Soundfield, Soundscape, Studiomaster, TGI, Turbosound, VW Marketing, Wembley, Wharfedale and Zero 88.

Audio-Technica

At this year's PLASA Show, Audio Technica is planning its largest and most interactive exhibition ever. First time UK exhibits will be the new 'smart mixer' - the AT-MX341a. This unit is capable of managing a maximum of four microphones and units can be daisy-chained to operate multiple additional mixers and microphones. The mixer has been completely re-engineered to offer a number of key changes.

Also at the show for the first time are the new ATH-M40 and ATH-D40 studio phones. Both of these units incorporate high quality application-specific premium performance and are designed for long lasting reliability and comfort.

Further additions to the Audio Technica range are the ATH-COM1 and ATH-COM2 combined microphone and headset units, and new to PLASA will be the ATM75 and PROBHE headworn mics. Complementary to the ATM75 is the new PRO 8HE which is a lightweight unit. Also at the show for the first time will be the new Ramsa WS-A35E near field monitor and the WS-K40 bass bin. The WS-A35E is designed to deliver up to 200W of high-fidelity sound, whilst the WS-K40 is a compact bass reflex unit, containing a 20cm subwoofer with a frequency response range of 40-500Hz.

These are just a few of the many new products Audio Technica will launch at the show.

Catch them on stand A220.

Multiform at Mayfield



Iain Price-Smith of Multiform with Abigail Hopson, a student at Mayfield College.

As part of a Neighbourhood Engineers scheme organised by the Council of Engineering Institutions, a group of schoolgirls from St. Leonards Mayfield convent have constructed a Zodiac 18 Level Memory lighting board. The parts were donated to the school by Iain Price-Smith, managing director of Multiform Lighting, to provide a practical project to encourage girls to consider electronic engineering as a career.

The actual construction of the board by the pupils, with little or no experience of electronics, involved identifying components, understanding parts lists as well as learning to solder. The final product was tested at the factory and the workmanship proved to be as good as any of the company's manufactured products.

A new 36-channel version of the board, which includes a number of extra features, is to be launched by Multiform on stand A140 at the PLASA Light & Sound Show next month.







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The Rolling Stones at Brixton Academy - Steve Moles with an L+SI Exclusive

Brixton Academy has recently been the subject of a well publicised buy-out offer. The purchaser is a little known religious sect who wish to convert the premises into a Temple. The local council are hesitant; they are reviewing the change of use and how it will affect the residents and surrounding area. If they wanted to see how the venue would look as a place of worship, how the ecstatic faithful might raise the roof in roaring affirmation of their faith, then they need look no further than July 19th when the Rolling Stones came to play. Mick Jagger, pausing for the briefest of moments to catch his breath after the second song, described the show thus: "This is a bit of a laugh," but by that time, all 3,800 of us had sung our hearts out through 'Honkey Tonk Woman' and 'Tumblin' Dice' and we knew that this was a spiritual occasion. In confirmation of the uniqueness of this show, the balcony was filled with many a famous face, Dave Gilmour and George Harrison among them.

So, how do you put a 29-truck production into a 3,500 capacity venue? Well, you don't; but if you use the same band and crew maybe no one will notice. And maybe there's the key. What set this show apart, from a production angle at least, was the use of both crew and equipment from the stadium tour for what is, by Jagger's own admission, a band indulgence. The band do it to refresh themselves from the rigours of a year of stadium rock, which makes good sense. Production manager Jake Berry (to whom we owe many thanks for this unique opportunity) takes the view that the crew should be refreshed at the same time.

The use of touring equipment makes good financial sense, providing, that is, it can be easily and cheaply extracted during load-out and re-integrated at the next show without slowing down the load in, as proved to be the case. It would, after all, have been a lot easier for Jake to order a proprietary rig for Brixton and save himself a great deal of added planning and hassle. Hats off to him for taking the trouble - the comfort of using the familiar reflected on the confidence of crew and band alike. The other great advantage is that the entire budget allocated to the show can be devoted to making something special out of it. For example, a sub-stage was put in to facilitate the positioning of monitors below it, allowing the greatest amount of space not only for Mick to prance his stuff, but also keeping the stage clean and simple. The other big spend for these shows was the drapes, blacks, grey silks and custom-made leopard skin prints for three distinctive looks (supplied by Steve Tuck at Blackout).

A mobile sound recording studio was parked outside and video footage of all the club shows has been recorded, so a live album/video might be expected. Again the touring video crew was used for this purpose, as lighting designer Patrick Woodroffe pointed out: "Who better to produce such a video? This team has done over 100 shows with the band, so they know all the cues."

Benji Lefevre mixed the Showco Prism system from just below the balcony edge, never a great position but then theatres with balconies always present the need for compromise. However, it didn't sound like it presented him with any problems. Two Harrison consoles, plus a Yamaha PM 4000 for opening act Reef, made for a huge mixing corral - there were even six BSS Varicurves in use. This array of hardware was a surprise, considering the band's unpretentious back line gear, a Fender Twin, a Vox AC30 and Hammond B3 to name a few. Charlie Watts' drum kit was a

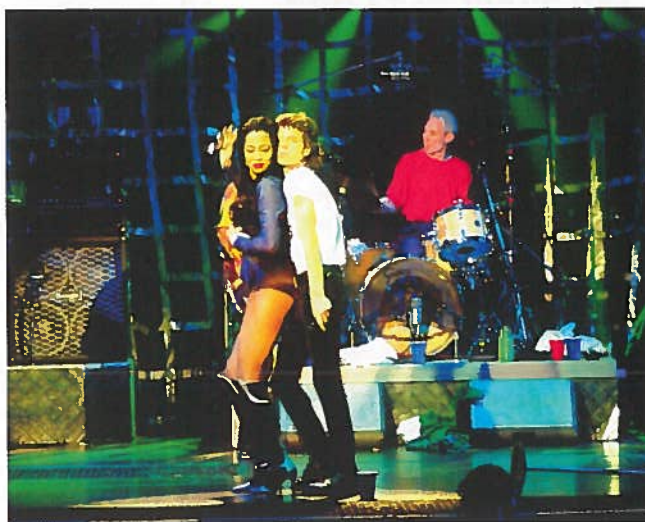
statement in restrained modesty: kick, snare, two toms, high hat and a pair of cymbals, but then, I did see Benji address every bit of this equipment during the two-hour, 22 song set.

The speakers were flown: arrayed two columns per side configured from the top as four Prism's, two of their one-third size delay cabinets, two more Prism's, and at the bottom, a pair of Prism full range cabinets. Stacked beneath these were a further four full range cabinets.

The sound can best be described as percussive - it seemed to have immense force, not just at the top and high middle, but right across the spectrum. Amazingly, there were times when the audience singing was so loud it was hard to hear the PA, but then this was no ordinary show.

In truth, a bit of lighting was brought in: three trusses from which to hang the 67 Vari*Lite (a mix of VL5s and VL2Cs) plus associated repeaters and trunk cables, and 11 Pani HMI followspots. The truss was a necessity: although they have a tiny amount on the Stadium tour, it is integrated into the set, and the tour spots being Gladiators would have taken up rather too much balcony space. Patrick and set designer Mark Fisher came up with the idea for shaping the stage with drapes, the leopard skin especially was to provide, "something louche, but simple," said Patrick.

The results are dynamic, the band open the show on a totally black stage - borders, legs and backdrop. The addition of the grey silks, legs and a scalloped border on the eighth number subtly expanded the stage by giving the eye something to fix on for depth. What resembles a silver portcullis (a drape from the never-used stadium B rig system) is lowered over the back drop and brings some glitz to the proceedings. But it is the sudden reveal of the leopards for 'I Go Wild' at the mid point of the set that totally lifts the show, as



we are moved from concert venue to a rude and rather vulgar club.

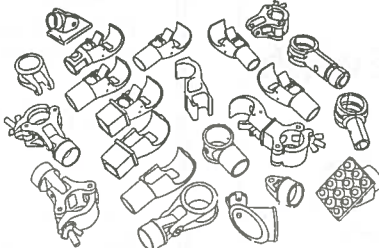
Artisan operator Dave Hill, who, as Patrick's right-hand man and lighting director for the tour probably has more influence over the lighting than any, uses many of the stadium show cues, though obviously modifies the looks. "Changing things for this is not as hard as it might seem," Dave explained. "On the Stadium shows the band often change the set list to keep themselves fresh - if I stuck to a rigid proscribed set of cues there would often be times where I'd have perhaps two or three songs in a row all lit in the same basic colour theme. So I'm well used to taking basic cue points of the songs as triggers, but changing colours or beam size at those points." Nevertheless, Dave was still re-programming right up to doors, even if Patrick did praise his abilities somewhat ambitiously: "Dave can create a whole show in an hour-and-a-half." Well, it wasn't far off.

A long list of superlatives is unnecessary - it was a show of historic proportions and will enter rock folk lore as such. You may also be interested to know that the proceeds from the show will be given to charity. For myself, it was a revelation. As a teenager of the sixties you either fell into the Beatles or the Stones camp. I was in the former, but now I've seen the light and been converted.

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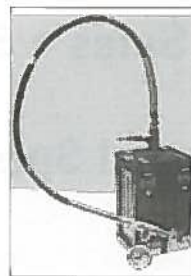
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Brickman at PLASA

Martin Professional have secured the services of Marc Brickman for the design of their lightshows at this year's PLASA and LDI shows. Brickman, who has enjoyed worldwide success with the recent Pink Floyd tour, has also been responsible for lighting Bruce Springsteen, Paul McCartney, Tina Turner, Duke Ellington and Neil Young.

Centenary for NT

The National Trust presented a special Centenary outdoor event at West Wycombe Park near High Wycombe in July. The climax of the evening's entertainment was a son et lumière based on the Battle of Trafalgar, involving live action, cannon fire, pyrotechnics, surround sound and lighting.

Part one of the performance - staged by Arbour Green Productions - consisted of music, dance and dramatic action aboard a mock-up of HMS Victory with a live military band and the Caravaggio Quartet. Part two included the entire story of the battle itself, with a 32lb cannon firing between the Victory and Le Rédoutable, ending with a fireworks display designed by Keith Webb for PyroVision.

Sound playback for the event was via DigiDesign Protocols software running off an Apple Mac, which also triggered spot sound effects from an Akai S1100 sampler. A Denon DR990R minidisc recorder was also in use, and the audience were surrounded by a Renkus-Heinz speaker system fed via the matrix outputs of a Soundcraft 8000 mixing desk.

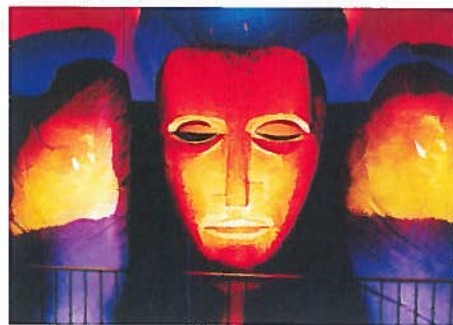
Celtica Experience

The Celtica Experience, situated in Machynlleth, mid-Wales, offers visitors the opportunity to travel back in time 3000 years. Designed by John Sunderland, the exhibit is a 3D dramatisation of Celtic life - past, present and future.

The responsibility for bringing the concept to life with sound and vision fell to AVE Realisation of London. The exhibition is divided into three main parts. The first problem was how to deliver the commentary and the children's narration without detracting from the visual show, and the solution was to install a Sennheiser infra-red sound system. Each area of the exhibition is illuminated by a number of radiators driven by a transmitter capable of transmitting a total of eight languages, each allocated a different channel.

The lighting shows are controlled by means of three Pulsar Masterpiece 108 lighting desks operated via a MIDI link from the AMX overall systems controller. Ambient sound throughout comes through hidden DAS speakers, supplied by Lighfactor Sales, with video sequences projected using Sanyo LCD and front surface mirror projectors. Owing to the strict spatial limitations imposed all the profile and focusable lamps had to be specially manufactured before being installed and combined with specialised lighting effects, gobos, ripples, trackspots, pulsating fresnels and hanging smoke.

Celtica is a personal experience for every visitor and no two people will experience the 'same' show. There is much to take in, including the Foundry, with its revolving cauldron rising through the false floor in a haze of smoke by means of AVE's own-design stage lift and pulley



system and the Origins Gallery where a Sanyo LCD projector and four Optikinetics' projectors are used to project images onto a large canopy and two fibreglass 'stones'. In the Forest and Other World, fire effects are produced by spots situated below floor level, shining beams of flickering light through hanging smoke. Ambient whispering of ghosts can be heard as visitors walk under the forest roots, an impression created by suspending piping and hanging shreds of cloth, gently swaying in the breeze from cooling fans.

Finally, visitors are led into the Vortex for a theatrical presentation of the Celtic future where they sit in a 12ft deep pit on a timber platform which forms the sides of an arena. A watery, whirlpool effect is produced by projecting circular video images onto two screens, one at the bottom of the arena, combined with pulsating mini fresnels and DHA gobos. Directly in front of these stands the Tree of Life, illuminated with intelligent spotlights as a druid transforms the boy guide Gwydion into various animals to prepare for his journey into his future and their past.

Alison Hunt

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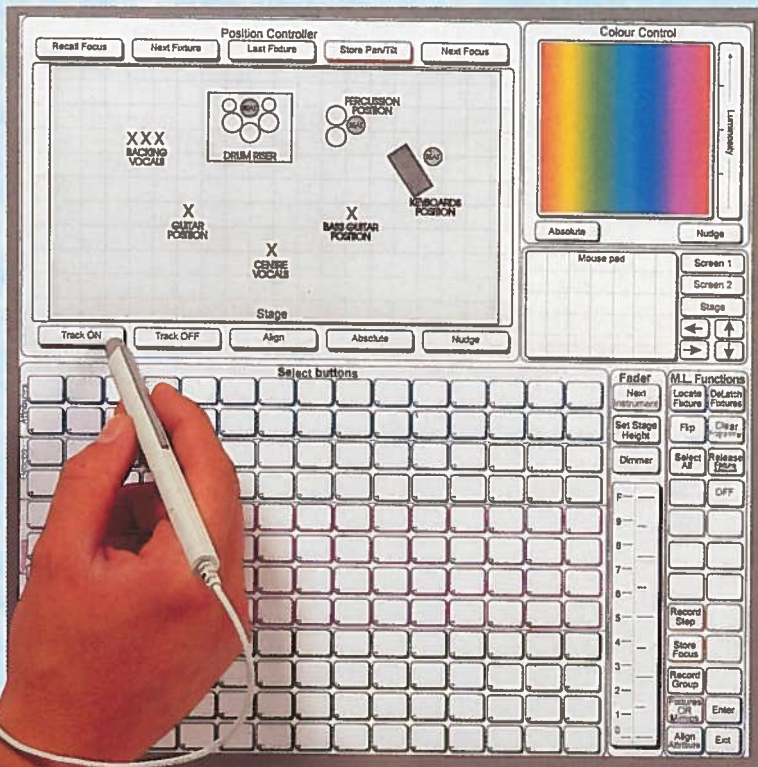
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Polesden Lacey Son et Lumière

A son et lumière event must feature high on a lighting designer's wish list, but opportunities in England are few and far between, principally because the weather is notoriously unreliable. However, one such event fell into the lap of lighting designer Bob Bustance when he was approached by Margaret Hunter, deviser and director of the Polesden Lacey Son et Lumière, to design a kaleidoscope of rapidly moving and changing scenes for the 75-minute performance. Taking place against the east facade of the National Trust property in Surrey, the play was to recount the house's long history through both world wars.



The project was the culmination of many months work, co-ordinated by Margaret Hunter, with assistance from David Stoves, technical manager of Polesden Lacey's Open Air Theatre. Having persuaded Bob Bustance to light the piece, she soon secured the services of Malcolm Akers at Gradav to supply the majority of the equipment, with additional effects, notably projection, coming from Ross Ashton at ETC UK, whilst control and some additional lighting was provided by Andy Collier and his team at Strand. For sound, Margaret Hunter enlisted the services of Skan PA, who provided the main PA system, featuring Turbosound Flashlight cabinets.

The main performance area lighting came from two towers approximately 40 metres away from the set. Each tower, supplied by Alistage, had three 6-way IWBs, with 12 Strand Cantatas, a single Leko, an Optique, four Parcans, and a CSI solo followspot perched on the top platform. The Pars were used to flood in deep cross-stage washes in red, blue and amber, whilst full cover from four of the profiles in medium colours, was mixed in.

On the ground, in what is traditionally the footlights position, 18 floor-cans were fitted with Oscar Lightpaint scrollers, giving Bustance the opportunity to light both the action on the stage and the magnificent back-drop of the house in a wide array of colour washes. Also at floor level, about two metres from the house, 14 500W outdoor floods and four Minims provided a variety of uplighting to the facade itself.

Some of the most stunning images came from the two large ETC 5kW projectors, seated majestically in their specially constructed Alistage towers, which provided the backdrop to complement the various scenes, in particular the first and second world war episodes.

Aside from the main performance area, the south terrace was to be lit for one static tableau featuring the Duke and Duchess of York on honeymoon at Polesden in 1923. The house beyond the columns of the porch was lit by six Coda 1s in a mix of deep blues and mauves. Each of the eight columns of the portico was uplit by Birdies (the outer in golden amber and the inner

in chrome). The heraldic griffins at the top of the stairs leading to the porch were cross lit by Par Cans, whilst the two actors were lit with tightly barn-doored Minuette fresnels in pale straw.

The last area to come 'live' was the house itself. Initially, the idea of having equipment in the house at all was anathema to the National Trust. The go-ahead was only granted on the basis that tungsten halogen lamps could not be used in the house. Gradav were therefore charged with solving the problem and came up with five Patt 137 floods with tungsten (NT approved) lamps and an original Patt 243 with tungsten bubble. A Strand 430 desk with Genius Plus software provided the control, with a GSX desk available as back-up.

On the sound front, things came together a little easier. The recording for the performance was carried out at the BBC World Service studios at Bush House. The main narration tape, containing all speech tracks and any pre-timed mixed sequences of music and effects, was transcribed to reel-to-reel tape at 15ips. The sound was recorded in half-track, with all the speech panned on to the left track and the music on the right track. This would effectively allow the levels of the two tracks to be varied with respect to each other as ambient noise conditions dictated. The music covering the actions of the vehicles was recorded on DAT, which was then played under the speech tracks. In practice two Revox B77 tape machines were used for the master recording tapes, whilst two Sony DAT players were employed to support the background music.

The main sound system, provided by Skan PA of Reading, gave a full rich sound exploiting two stacks of Turbosound Floodlight speakers, controlled through a Midas desk. For most of the time a mono sound image was mixed and played: the only exception to this was the sound effect of a Spitfire aircraft, which was panned across the system as the followspots searched the skies like searchlights.

Photo: Bert Crawshaw

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WL Exports

White Light has experienced a huge increase in its international business and is exporting staff, as well as lighting! Sales manager David Howe has just returned to White Light's Fulham headquarters after six weeks in Tokyo as assistant LD to Paul Pyant on the Japanese production of *Carousel*. The production will run for four months at the Imperial Theatre, prior to a national tour visiting Osaka and Nagoya.

Meanwhile, on the equipment side, one of the more unusual recent projects was an enquiry regarding the sale of a basic lighting rig from a 'small amateur dramatics company' in the Falkland Islands. Sales staff at White Light were intrigued to receive a purchase order from RAF Mount Pleasant, followed by an enthusiastic letter of thanks from the Squadron Leader. Other overseas business includes the sale of almost 200 lanterns and effects to the new Vikingland project in Denmark, and the sale of Thomas Mini Batters to 'Teatro de Parma'.

Sales and hire enquiries to White Light can now be conducted via CompuServe: the address is <100637,3040@compuserve.com>

SLS Service

Set Lighting & Sound, the nightclub audio and visual installers from Kent, are having a great year since completing a major project at the Kaos Club in Swindon. The company have been keeping busy with installations all over the country including updating a system in The Gin Palace, Old Kent Road, new lighting in Benjy's London, a sound and lighting outfit in The Roof Gardens, Basildon and a sound system in Chaplin's at Salisbury. Their latest commission was for The New Royal Cinema, Faversham, Kent where the owner wanted to entertain his audience with a light show before the film. Eight Martin Pro 218s, a Pro 518, a 2308 Martin controller and Pro 2000 smoke machine were subsequently installed by the company.

Aerial Antics



Sennheiser is lending radio microphone equipment, along with its technical expertise, to an ambitious music, lighting and dance event in London this year.

High Vaultage is a three-way collaboration encompassing choreography, trapeze, light and projection, musical performance, drama and a brand new arts facility for the capital. Aerial dance company, Momentary Fusion, have collaborated with contemporary composer Gareth Williams and Italian lighting designer Fabrizio Crisafuili to create a site-specific performance for the newly-opened Arts Depot at London's King's Cross.

The 1053 belt pack transmitter and diversity receiver systems with MKE2 clip mics will be used to close-mic and amplify the breathing of the two principals as they perform a spectacular aerial ballet. The sound of the breathing will be used to create a natural rhythm track for the musicians.

Light Opera Move

At the end of July, *Light Opera* moved two hundred yards along the road to much larger, more accessible premises at Unit 41, Sandy Way. Only the unit number changes. The remainder of the address, the fax and telephone number and the mobile number all remain the same.

Asylum Seekers

Soft Asylum have opened a new studio, workshop and demonstration facilities in Fulbourn, near Cambridge.

The project is a unique venture providing full multimedia production and editing alongside a 2,000sq.ft production studio with in-house audiovisual services including full-colour laser system, multiple video projectors, lighting rig, smoke, wind, UV, SVHS video, PC and CD-rom effects technology.

The studio and facilities provide a venue for individual and groups to create, rehearse, perform and record. Demand is such that two groups have already produced recordings of their performances, including trapeze, dance, UV hangings and body painting.

The company are running an open day on Friday 11th August. Anybody interested in attending should contact Soft Asylum in Fulbourn on (01223) 882111.

Reach for the Sky

Belzer Design International, headed by lighting designer Rick Belzer, is currently lighting the world's largest interior spherical sky dome for the new *Sliver Legacy Hotel and Casino*. Located in Reno, Nevada, the \$360 million hotel/casino opened in late July. The 190ft dome, which towers above the casino floor, is painted as a desert sky. The painting utilises pigments illuminated by both tungsten and ultraviolet light, revealing daytime clouds in a blue sky and vivid sunrise and sunset colours when lit with blacklight.

Belzer Design is lighting a recurring two hour show which starts at dawn, cycles through the day and ends with a spectacular storm sequence. All elements of the show are controlled via SMPTE time code. The company has been working on the project for the past 12 months.

Lighting equipment is being provided by *BASH Theatrical* and includes the following: 960 ETC Sensor dimmers, ETC Expression 2x and ETC Concept 2x lighting control desks, a mix of 1300 conventional light units, ETC Source Fours, Altman T-3s, Pars, 22 High End Cyberlights, 75 High End Dataflashes and 20 Wildfire 400F Blacklights.

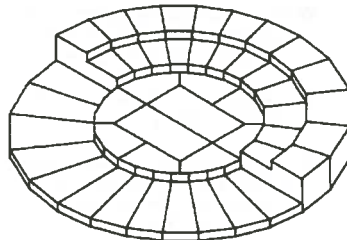
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Going Live for Theatre

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Tickets, available in advance at a cost of £125, will include all meals. Please contact Katrina Davies at Soundcraft Electronics, telephone (01707) 665000 for details of enrolment.

M&M Small Change

M&M will be launching the world's smallest production colour changer at PLASA this year. The new 4" Rainbow colour changer is designed to widen their use by offering an affordable unit to fit traditional 650W theatre lanterns. The changer has an internal fan which can be controlled via a separate DMX channel to lengthen gel life. The gel string, which self-tensions when powered up, takes up to 21 colours.

Storming the Bastille

For Jean-Michel Jarre's recent Bastille Day concert in Paris, Edwin Shirley called in Unusual Rigging to fly three geometrical-shaped screens from a 100ft high goalpost. The screens were lit internally and featured an automated chain hoist system giving them a degree of controlled movement.

People on the Move

Rosco Inc has made two new additions to its staff. Mitch Hefter, formerly with Electronics Diversified, Macro Electronics and Strand Lighting Inc, has joined the company as director of engineering services. Daniel Faulkner, a graduate of the University of Illinois, has joined the product development team.

Reorganisation at Mark IV Audio Europe has resulted in the appointment of three new vice presidents. Bob Doyle, well-known in the pro audio industry, will lead the Mark IV Pro Audio Group in Kidderminster, England. Ronald Ledermann, former general manager of Mark IV France, will head the sales office at Ipsach, Switzerland, and Hans Peter Richter, a long-time executive of Dynacord, will head the marketing unit in Straubing, Germany.

Paul Godfrey has been appointed sales manager at Crest Audio UK, in charge of the installation and retail sectors of Crest's business. Godfrey joined the company from Yamaha, where he was a pro audio specialist.

RCF UK have appointed Andy Austin-Brown as sales manager for their pro audio division. He has an extensive background in the industry, having recently worked for Martin Professional as sales manager for their Mach speaker range.

Jon Cadbury will join the Vari-Lite Group on 1st September, and will be responsible for the co-ordination of events and concert tours. Warren Steadman, formerly with LSD, has joined Brilliant Stages as engineering manager. In-house promotions see David March become general manager of Vari-Lite Europe and Jim Douglas graduate to customer operations manager.



Glantre Roll Call

Almost the entire staff of Glantre assembled outside their new premises at Richfield Avenue in Reading to mark the company's 21st anniversary. Joining Derek Gilbert and his team are three visitors from Glantre's overseas operations: Tony Konnaris, an account and administration manager in Cyprus, Andy Quinn, site manager in Portugal and Henry Lewis, general manager of the Australian operation.

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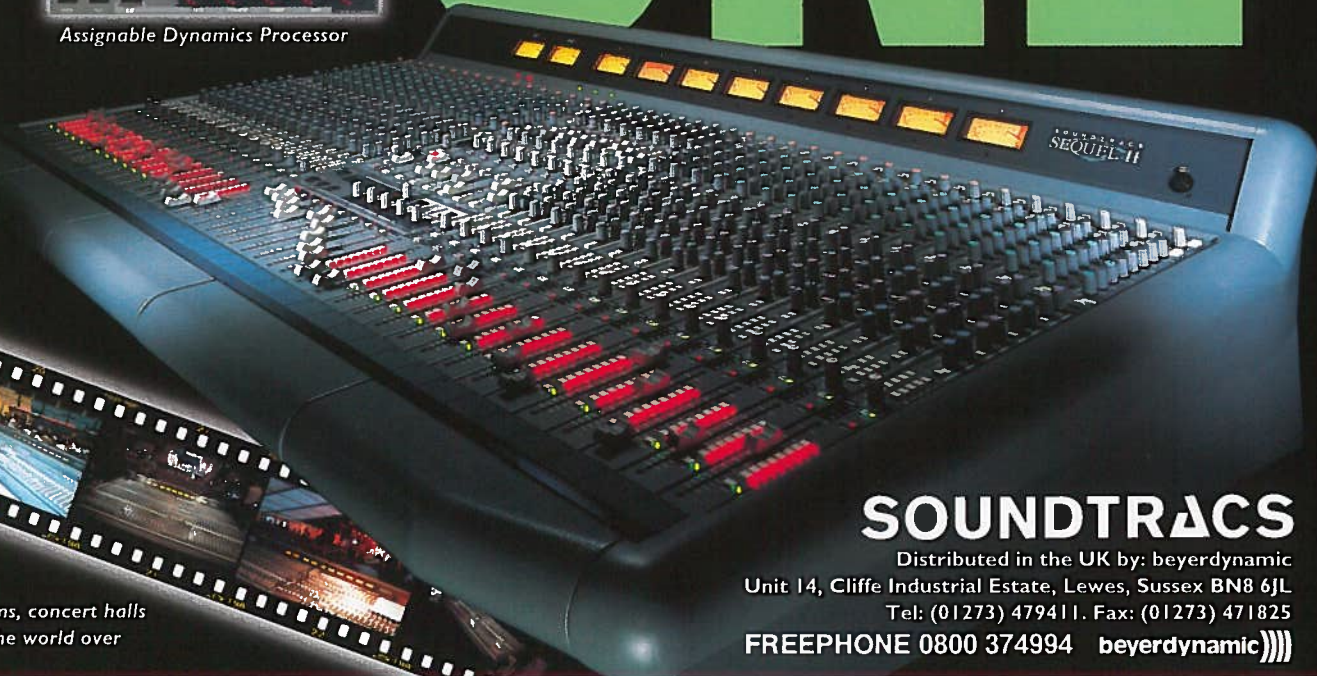
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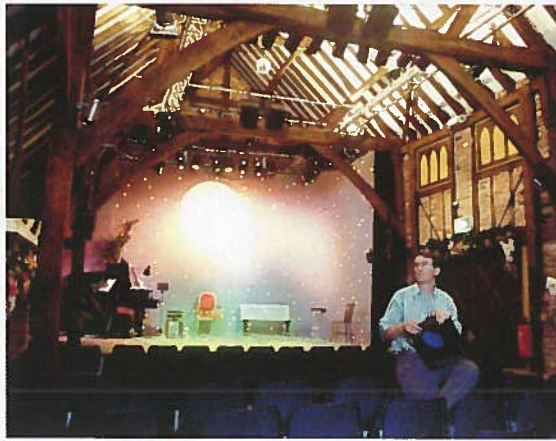
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Barn Theatre

To achieve the maximum out of the minimum was the challenge faced by Theatre Projects lighting designer Mike Odam (pictured right) for the first ever production to take place at The Barn Theatre, in the village of Great Offley, Hertfordshire.

Housed in a recently converted 16th century barn, this unique theatre seats an audience of 100 and for its opening production, the Noel Gay Organisation's *Polishing the Sun* - Odam's task was to give the show the quality feel of a West End musical on a stage measuring only 25ft by 15ft.



Spanish Opera's VLC

AVAB have won the contract to supply the new lighting control system to the Spanish National Opera in Madrid. The 3072 channel Viking VLC system is equipped with full A/B back-up and Ethernet control on an optical fibre link to the dimmer room.

With the award-winning VLC system, AVAB has developed a high end multi-functional lighting control system where conventional dimmer control is integrated with attribute control of moving lights and scrollers. The system can handle up to 6144 control channels.

The VLC system has now been installed in many French and Scandinavian theatres, including the Gothenburg Opera House (see L+SI, Feb 95), the Stockholm Opera, the Helsinki City Theatre and the Tampere ETT theatre in Finland.

More Lift for ROH

Stage Technologies has installed six winches into the Royal Opera House in London to boost the old counterweight system which has been in place since 1900. The need for a more efficient lifting system had increased over the past few years, as sets have become more ambitious and consequently heavier.

The ROH approached Stage Technologies at PLASA '94 with a request for designs for a power-assisted counterweight. The company designed six new winches to increase the counterweight capacity threefold to around 750 kilos. The contract also included specially designed frames to allow the motors to move to any counterweight on the fly floor, thus enabling them to drastically reduce the number of motors.

Searchlight Co

The Searchlight Co will be showing two new searchlights at this year's September exhibitions - PLASA in London and LIW in Birmingham.

According to the company, the multibeam 6600W Dominator is the most powerful light of its type available, using the same three planes of movement as the smaller Space Flower, which has now become an industry standard for attracting attention to important events and venues.

Space Cannon searchlights have also been added to the range. These are available in various formats, incorporating Xenon lamps from 2,000 to 10,000W with full control over the pan and tilt movement. The Searchlight Co are on stand A182.

LARES in Vienna

The largest ever outdoor application of Lexicon's new LARES technology (Lexicon Acoustic Reinforcement and Enhancement System) took place at the recent Vienna Festival in Austria.

The annual celebration of Vienna's musical heritage opened with a concert by the Vienna Philharmonic Orchestra and the 100-strong Arnold Schonberg choir.

Sound Art Services from Vienna faced the traditional challenges of outdoor classical music performances. To address these problems, Sound Art Services employed the Lexicon LARES in an unusual, but effective application.

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Pride and Prejudice



The Gay Pride '95 Festival. photo: Paul Stanley

LD David Kidd experienced some variety in his work earlier this summer, illustrating the demands of freelancing in today's market. Within a two week period he was lighting the massive Gay Pride '95 Festival in East London's Victoria Park and following that he was at work on the stage premiere of Nigel Baldwin's play *Zanna* at the Greenwich Studio.

Pride '95, one of Europe's largest free music festivals, featured Alison Moyet, D-Ream and Erasure to name a few. The 60ft x 40ft stage held 50 VL5s and VL6s under the command of Vari*Lite programmer Andy Voller on the Artisan. Incorporated in the rig, supplied by Concert Productions Lighting, were eight 8-Lite Molemag suspended upstage, above a 30 cube videowall supplied by PSL.

In contrast, a tale of murder brought Kidd down to earth the following week. Set in a dreary provincial town, *Zanna* deals with censorship and abuse, as three people are forced to examine their own inner conflicts to discover why a teenage girl murders her own step-father.

Sylvania Launch

Sylvania will launch several new products at this year's PLASA Show, including a range of BriteXe xenon short arc lamps which, they claim, has the most precise focusing and highest brightness of any lamp technology. The 5,900 degree K white light, continuous throughout the visible spectrum and constant throughout lamp life, is perhaps the most efficient lamp source for approximating daylight in cinema and large screen projection and video projection and stage, studio and other applications.

Also on show will be the BriteScreen, designed for the new generation of audio visual and presentation equipment with high efficiency and colour properties. A new double-ended version has been added to expand application possibilities.

Happy Anniversary

Sennheiser UK recently threw a major party in celebration of the parent company's 50th anniversary which saw over 150 guests eat, drink and revel late into the night. Customers, dealers and industry associates joined the company's staff and guest of honour, Professor Dr. Jörg Sennheiser, president and son of company founder, Professor Dr. Fritz Sennheiser, at the Outlands Park Hotel, Weybridge, in Surrey.

A full feature on the history of Sennheiser will appear in the next issue of L+SI's sister publication, Sound+Communication Systems International.

Premiere in the Park



The premiere of Disney's new animated feature film *Pocahontas* was shown free to 100,000 people in New York's Central Park recently.

The film was projected onto four huge screens constructed from sea containers. Eight projectors, based on the 360 degree CircleVisions used in Disney's theme parks, showed perfectly synchronised 70mm prints of the film. The projectors had to cope with a 225ft throw, so special water-cooled 7000W lamps were designed, giving the eight units a total projection power of 56,000W.

The sound system for the event used over 400,000W of power, driving more than 200 EAW Stadium Array series speaker cabinets. The system included over 100 KF850s, KF852s, KF853s, BH852s and SB850s, all run through 150,000W of Crown MacroTech amplifiers.

The event was the result of nearly a whole year of planning. Director of operations for the event, Bob Gault, told L+SI: "This is the biggest event any of us have ever thought of doing. It's four or five times the size of a typical rock concert, with the added challenges of showing a perfectly synchronised film on four screens at once."



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Light & Video Shorts

Osram recently welcomed guests to its Wembley headquarters on an Open Day (shown below) for its light studio which has just undergone major refurbishment. The studio displays the wide range of lamps available from the company.



Elsdale Lighting Design, an international lighting design practice based in Singapore, has been appointed to provide lighting design services for the new Singapore Parliament Complex and the Singapore Parliament House. The company will be working in association with **Kevan Shaw Lighting Design** on various aspects of the project.

Owl Video Systems has announced a record month for May '95 with turnover growing by 41% on the previous month. This comes at the end of a very successful year and has meant that the company has had to recruit further technical and sales staff. Owl has also announced a joint initiative with GBI International to combine the resources and expertise of the two.

The new Ferrari F512M took centre stage during a launch presentation at the Donington Park circuit in Leicestershire, thanks to a special

platform installed by theatrical equipment company **Stage Services**. The car was raised on a Pro-tec stage measuring 4.8m x 3.6m x 60cm.

White Light is providing the lighting for *Burning Blue*, a new play which opened at the Theatre Royal Haymarket at the end of July. The lighting rig, which includes three Digital Light Curtains controlled by DHA's new DMX Light Talk interface, and four of DHA's latest gobo rotators and custom discs, was designed by David Hersey.

Kent-based **Quest Technical Systems Ltd**, whose projects include the Tower Bridge Experience, has been awarded the BS EN ISO 9001 quality award for its quality management system following assessment by Lloyds Register Quality Assurance Ltd, a leading certification body. Approvals were awarded for the 'design, assembly and management of installation of audio, video and special effects systems'.

Leeds sound and light equipment retailers **Fast Forward** have moved to a larger showroom and office complex. Still in the heart of the city, the new two-floor retail and trade distribution centre stocks a wide range of equipment for DJ and club applications. The company can now be contacted on 0113-245 4200.

Howard Eaton Lighting Limited (HELL) has completely refurbished the lighting rig and equipment for the revival of the UK touring production of *Evita*. The lighting design, by Howard Eaton, is based on David Hersey's original West End production, and incorporates 31 new HELL light curtains as well as state of the art lighting and dimming equipment hired from Theatre Projects Limited (TPL).

Dartford-based **Electrosonic** have achieved the ISO9001 standard certificate for their quality system. On July 10th, chairman Robert Simpson

and managing director Philip Aminoff (pictured below, left and second from right) were presented with the certificate by the Mayor of Dartford, councillor Len Eaton.



Stage Lighting Book

Lighting is crucial to the success of any performance and in Nigel Morgan's new book, **Stage Lighting for Theatre Designers**, every aspect of the lighting design process is covered, from lighting styles, equipment, relationships with directors and set and costume designers, to the development of a design from first ideas to the first night (illustrated by several case studies).

This is a comprehensive guide to the art of lighting design for students, as well as directors, designers and technicians. All practical aspects, including constraints of budget, time and space are considered, along with explanations of the physical behaviour of light and how to make the best use of it. The foreword is by Mark Jonathan, head of lighting at the Royal National Theatre.

Nigel Morgan has written the first UK degree course in theatre lighting design, and he is also a lighting consultant based in London. The book is available through PLASA's Technical Book Service on (01323) 642639.

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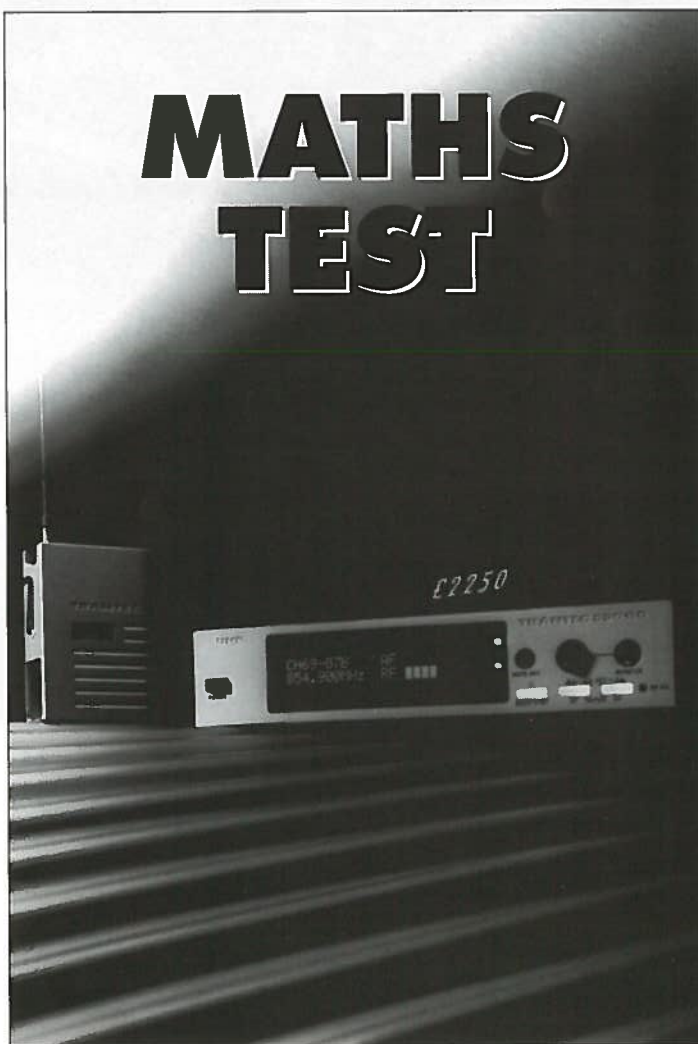
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Sound Shorts

Tony Taverner, producer/engineer for bands such as Duran Duran, The Jam, Sting and Bryan Adams, has become the latest big name to adopt **Spirit's** Absolute 2 nearfield monitor speakers.

Since the highly-publicised opening of the Virgin Mega Store in London's Oxford Street recently, the store's **Tannoy** speaker-equipped permanent stage area has hosted performances by Boy George, Kruez, Mary Chapin Carpenter, Boyzone and Eternal.

Audio Technica's microphones have been installed in Sheffield Cathedral, by local company **GM Carson & Co**, who won the order to supply the microphones to the Cathedral and to service the existing equipment.

Hot Chocolate guitarist Harvey Hinsley has upgraded his UK studio with a new **Soundtracs** Solitaire production console, supplied by Soundtracs' UK distributor **Larking Audio**. Harvey intends to re-record a compilation of Hot Chocolate's old and new material.

Dimension Audio has bought 20 **Trantec Systems** S5000 UHF radio microphones following evaluations of various radio microphone systems held in Oxford earlier this year.

Audio Design Services of Stockport celebrated their fifth birthday recently, after receiving special recognition in the Duke of Westminster Awards. The award was given in recognition of the company's contribution to the prosperity of the local community, operation of good employment practices and commercial, technical and financial success.

The **School of Audio Engineering**, London, has upgraded its main recording and mixdown facility, retrofitting full flying fader automation to its 32-channel **Neve** VR console. The studio is used by more than 50 students studying courses in sound engineering and multi-media.

Since the worldwide release of the **Soundcraft** k1 and k3 audio consoles, **Marquee Audio** have delivered k1s to **Electrosonic**, **Stage Electrics** (for use at the Princess Theatre, Torquay) and **PSL** for a variety of AV work. Although the k3 is not shipping until June, Marquee have already sold a 32 channel console to **MM Productions** in Colchester, Essex, and a 24 channel desk to the Young Vic Theatre, London. The ICC has recently purchased a customised Soundcraft Vienna II from Marquee Audio to install in Hall 5. The 24 frame console is fitted with four stereo and 20 mono inputs with a matrix to provide flexible interface for mobile recordings and transmissions. And finally, **Wigwam Acoustics** has bought another Soundcraft SM24 stage monitor console for its inventory. For its first tour of duty, the SM24 has been sub-hired to **SSE Hire** for Sinead O'Connor's European tour.

Turbosound have announced the first sale of a Flashlight rig to Australia - for Australian Concert Productions. Further Turbosound equipment has recently gone to Brisbane Concert Sound and to Sydney Opera House.

Following recent discussions at the NSCA convention, **ARX Systems** of Melbourne, Australia, have appointed Toronto-based **Contact Distribution** as their exclusive distributor for Canada.

Interest in a Cadac J-Type mixing console came from an unusual quarter recently as **Clive Green** and local distributor **Technica Engineering** enlisted the aid of the Chinese Red Army to set up a seminar in Beijing. Organised by Chinese Central Television, the seminar involved an audience of 90 engineers and technicians who were given a detailed tour of the J-Type and its facilities. The J-Type's military escort consisted of no less than 12 soldiers, who helped move the console into position.



Elton John's band have acquired a further **Allen & Heath** GL2 console for use on the current world tour. The additional GL2 has been specified for drummer Charlie Morgan and will be used to extend the on-stage monitoring facility for the US dates in August. Meanwhile, sound rental company **SSE Hire** have taken delivery of two GL4 desks for use primarily as monitor and FOH consoles for support acts.

Martin Audio have recently appointed **LMC Audio Systems** as the exclusive sub-distributor in the United Kingdom of their new Wavefront 8 Full Range Touring System and the Wavefront 8S Hybrid Sub-Bass System. LMC will have available road-ready Wavefront 8 demonstration systems and will also be able to offer finance and leasing packages and part exchange facilities for Wavefront 8 customers. As a truly independent dealer, LMC also have the ability to supply complete systems based around the Wavefront 8, and will act as dealer for all of Martin's product range.

Shuttlesound have issued their new 1995-96 catalogue. Much work has gone into a complete reworking of the original format with the result that the new version is far more accessible. Products are now listed by type, rather than by manufacturer and there is also a quick reference section at the back with a comprehensive product index which gives a page reference and pricing.

So, the new S5000 UHF system from Trantec looks good and costs a good deal less than most of its competitors too, but when it comes to the acid test, just *how good* is it?

to the S5000 (Hello Delta, Hello Dimension)

The S5000 has also made a name for itself with a number of broadcast and professional theatre companies and has even made its West

ACID TEST



If tests are anything to go by, the S5000 is right up there with the best (and in some cases quite a bit better)

In fact, it's so good that two of the UK's leading AV/Conference rental companies recently switched

End début in the Fats Waller musical *Ain't Misbehavin'*. (A big thanks to Orbital)

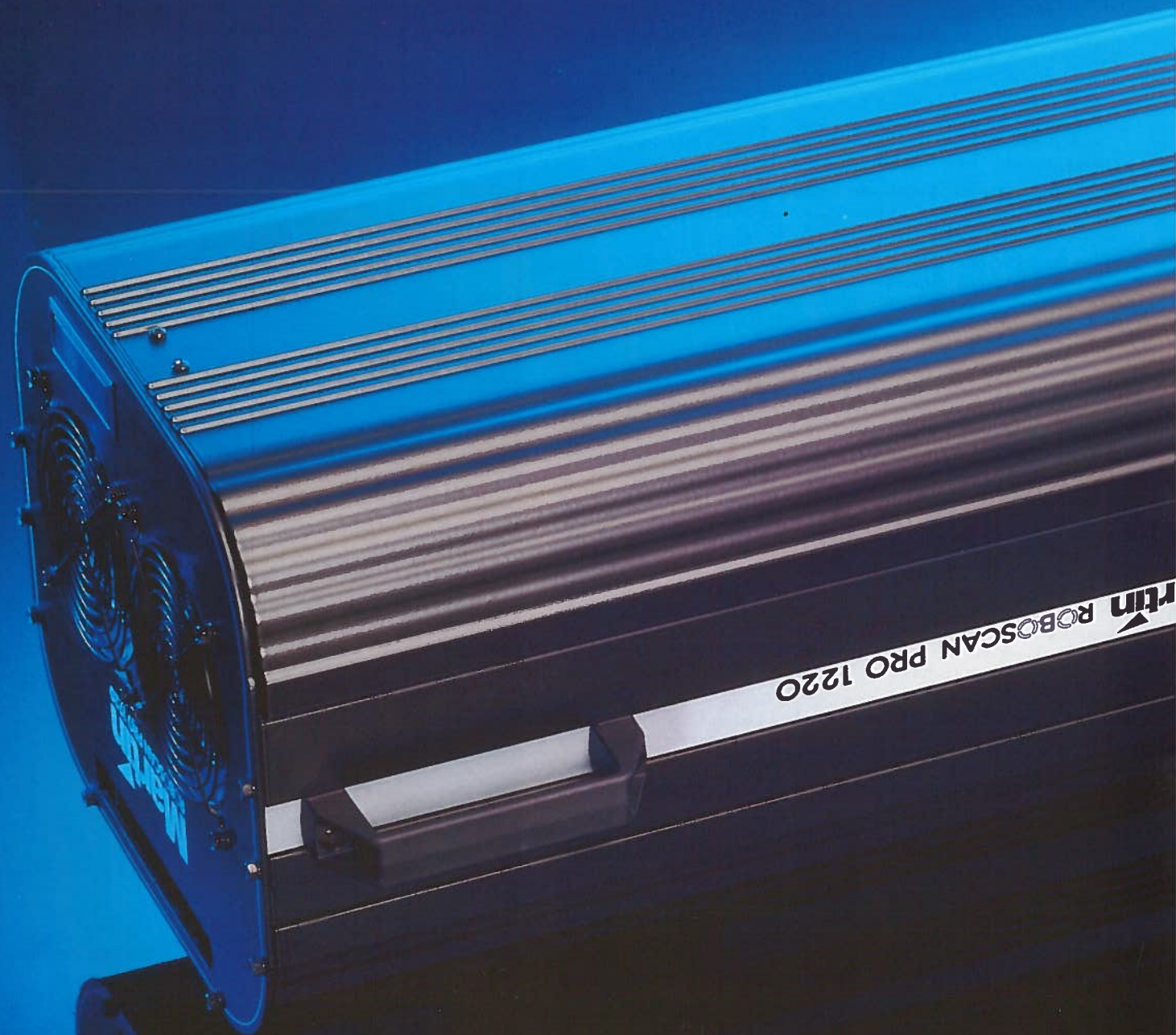
In short, the S5000 out-looks, out-prices and most importantly, out-performs almost every UHF receiver around - and there are tests to prove it.

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ON TOUR

by STEVE MOLES

AND PRODUCTION NEWS

Bon Jovi

Don Valley Stadium

LD: David Davidian

SD: Tony Blount

Last year, the site licence for this venue permitted only 42,000 people. This year, through the efforts and demonstrable professional approach of co-promoters MCP and ITB, the limit was raised by 8,000. I say 'demonstrable', because the day in question was the hottest of the year so far - a cloudless sky throughout the day saw temperatures reach 27°C. Inevitably, through the mid afternoon temperature peak there was a slow, but steady, trickle of over-excited, over-exposed, and over-beered casualties through the back-stage area. All were dealt with comfortably and efficiently and most returned to enjoy the show.

By the time the second act on the bill, Van Halen, came on at 6.30pm, the crowd were well settled and, dare I say it, ready to rock. The fact that they had the energy to match their enthusiasm, and were able to leap about throughout the two-and-a-half-hours that Bon Jovi played, says much about the slow steady hand of the security people and the general way in which the event was managed. However, before the bean counters see too many pound signs before their eyes, I would say that any more fans than those permitted on such a hot day as this would have made things uncomfortable.

SOUND

Tony Blount, mixing for Bon Jovi, has 140 of Clair Bros Audio's redoubtable S4 cabinets hung from the sides of stage. This is the first time I've seen S4s hung from a festival stage; for years they've been stacked two or three high and spread horizontally across two or three decks. (For those of you who've ever wondered how those enormous blocks of stone were positioned for the Pyramids, I can commend the Clair Bros technique of rubbing soap on the deck and then urging a couple of Egyptians to push 3/4 of a ton of stacked speaker cabinets). This array gave better sightlines to the stage (especially for those sat on the extremities of the wings), probably saved at least one truck load of scaffolding from the PA wings and gave an even dispersion around the stadium.

The latter was Tony's rationale for hanging 16 tons per side. In a departure from the Clair Bros text book, lighting designer David Davidian was able to cajole a change in grille cloth on the front of the cabinets from black to grey. Wisely he allowed CBA to select swatches themselves and then plumped for the most open weave of their selection. The speakers thus became an enormous projection surface for the two 6kW Chameleons out front, and with the cabinets' big four by four square profile, resembled in many ways a huge videowall.

Tony is mixing from two of Clair Bros' own 'A' boards: "I wanted to use a Yamaha, but there was just no way I could fit everything on . . . and hey, I got two boards for the price of one." A typically reticent sound engineer, Tony was especially modest about his role. "I'm just a sound leveller really, all the equipment I use out front is fairly generic. Some 15 years ago it might have been true that the front-of-house operator really had to be an engineer, but these days so long as you know your system well, you just need to be a leveller."



John Bon Jovi hanging out in his fifties bar, complete with jukebox and pinball machines.

This, of course, pre-supposes that you know what 'your system' should sound like in the first place. His 'generic equipment' included a Lexicon 480 with the new V4.0 software, a TC2890 delay and M5000 reverb, and an Eventide 3000. Sound was loud and pure: a lot of Tony's efforts are put into keeping the vocals up with the rest of the band. As I departed sheepishly at the start of the encores, it still sounded sweet and clear two miles away in the car park.

LIGHTING

Bon Jovi might feature in the pages of *Kerrang*, but they're not heavy metal - *power rock* might be a better description - however, they certainly warrant a lighting system of some force. Lighting designer David Davidian has a strong reputation for this genre and has on this occasion, squeezed a couple of notable firsts into his budget.

The system, from LSD, contains some new elements: 32 of the moving Wash Lights are here, as are 24 sections of their new TFC truss (affectionately known to the crew as Too F***ing Clever truss). The 8' truss is designed to carry three Icons permanently mounted (each second section has the necessary break out box mounted), as well as any assortment of other lamp fittings (in this instance, truss toners with Colormags and Terrastros). Also, three Wash Lights can be fitted in the space of one Icon. The truss is neat for a couple of reasons. Firstly, all the lamps stay permanently wired up, apart from the odd link lead needed between adjacent sections, and secondly, the truss profile is so low (approximately 8") that lamps and truss complete can drop straight into a flight case not dissimilar to the old six-lamp bar boxes that pre-dated meat racks. The low profile does mean some limit of span between two points, but I was assured that 24 feet was fine. David was particularly keen on the Wash Lights: "There are other automated lights, like the VL5, which is a great light. But these actually look like Pars, which is what they're supposed to replace."

Not physically of course, but from the point of view of the spectator this was certainly true. Despite competing against the late night summer sun and 81 Icons, the Wash Lights did shine through as strong as any Par and without that

slightly indistinct coloration that the eye is unable to focus upon, that you get from dichroics. There are also 150 ordinary Pars in the rig, 20 DWE MoleMags, 10 semi-automated ACL Moles (the two four-lamp panels that comprise the Mole are motorised to permit a 20É sweep) and 10 of the 2kW Xenon XeScans from Obies. These latter, powerful moving mirror lamps, certainly earned their place in the early evening when theirs' was really the only light on stage that actually read. That is apart from the seven Xenon Super Troupers out front and the eight Lycians truss-mounted to the back of stage. David calls spots and controls the show from an Avolites Diamond I, with Dale Polansky operating the Icons.

The stage set is based on a cityscape, as David explained: "Each year John Bon Jovi likes to play some club-size dates around New Jersey at Christmas time. He's comfortable in that bar/juke box type atmosphere and he asked if we could do something similar for this tour." The result is a simple set with two faux pinball machines and two bars (made by All Access) augmenting the back-line gear. Lucky winners of local radio station 'Fanzine'-type competitions get to hang out at the two bars during the show. For the backdrop, and in front of the PA, are huge Austrian drapes with mechanics courtesy of Tait Towers and the artwork painted at incredibly short notice by Ron Strong at Superior Backings in LA.

For the latter half of the show, inflatables of juke boxes embellish the stage proper, with four huge figures on the wings drawing in the more distant members of the crowd. Air Artists have produced two dragons, a Devil Elvis, and a positively pneumatic female torso with chicken's head and feathers. The balance of the limbs on these figures is such that agitation of their top-most support produces remarkably life-like arm swinging to the music. The transfer of small town bar to big stage worked remarkably well, helped greatly by John's charisma and his intimate familiarity with the audience. David summed up John's commitment to the show: "He loves to see the audience. He gets sad when the sun goes down at night. He wants to give a good show, with a good bill (great crowd pleasers Thunder preceded Van Halen), and good production value. He wants them to get their money's worth."

Plant and Page

Sheffield Arena

LD: Tom Kenny

SD: Dave Kobb

"I leave all the pyrotechnics to the band," LD Tom Kenny explained by way of summarising the show. In fact, the fuse has been smouldering since Plant and Page first re-entwined their musical lives on MTV's Unplugged. The sell-out audience at Sheffield were twitchy with reverential anticipation, but retained a generosity of spirit that saw opening band The Black Crowes amply rewarded for their difficult opening slot.

This is a musical resurrection without equal: where other bands have re-invented themselves for the eighties, nineties, or whatever, Plant and Page have picked up the ashes of Led Zeppelin and continued to forge ahead musically from right where they left off 15 years ago. Don't expect their greatest hits: if you want to hear 'Stairway to Heaven' you'd better dig out your album. Plant and Page have chosen to doff their hat to the sixties, not attempt to recreate them.

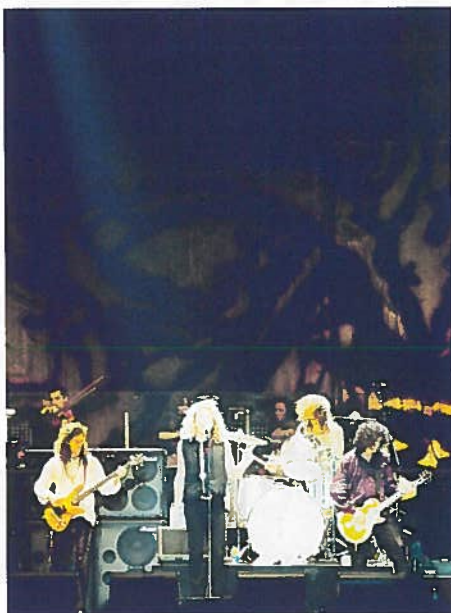
SOUND

The PA system is from Clair Bros - 48 S4s gird the stage, hung in two columnar rows of five, two four high, and three just two high to each side of stage. The left and right clusters appear remarkably close to centre, resembling two enormous inverted bra cups. That this speaker cabinet design coincided with the advent of Arena rock, and that Plant and Page were in many ways pioneers in establishing that circuit, gives some clue as to which aspects of their earlier incarnation they wish to retain.

Sound engineer Dave Kobb illustrated their historical aspirations perfectly: "I've got an old Eventide Instant Phaser from 1972 down here - it's probably one of the first pieces of electronics Eventide made for this business. Robert (Plant) wanted it, so I routed around and dug one out. I'm sure I could get something newer and more high tech' to produce just the same effect, but hey, why not? This still works." Dave has, however, forsaken the Audiomaster for the pervasive Yamaha PM4000: "With 32 musicians in the orchestra I need all the inputs I can get," he said, and therein lies the challenge for this show.

A classical string section and an eight piece percussion and string ensemble from Cairo occupy the entire back section of the simple, stepped stage set. Protected from the excesses of the rock band in front by a high wall of perspex, they are not a rock star's indulgence, but an integral part of the performance. The set will switch from volume rock to acoustic in the twinkling of an eye, and not just from song to song, but during songs as well, when Plant will spontaneously break into the unexpected. In the midst of 'Whole Lotta Love', already improvised to the point of being barely distinguishable, we were treated to smatterings of 'Season of the Witch' (Judy Driscoll, Brian Auger & the Trinity) and a Doors song instantly recognisable as such, but the old grey cells fail me on the title.

"Do they do this a lot?" I inquired. "Yes, this is not a science. The spontaneity of this band really keeps you on your toes," proffered Dave, with a wry smile. The string section, occasionally augmented by hurdy-gurdy player Nigel Eaton, gave that swirling Middle-Eastern feel that had come to flavour much of Led Zeppelin's later recordings. Coupled with Plant's voice, which seemingly has lost none of its youthful vigour, and Page's still mystical ability to wrench the most unlikely of sounds from his guitar, this was something not heard before, mixed with something we'd forgotten the sound of.



Plant and Page at Sheffield Arena: "I leave all the pyrotechnics to the band," says LD Tom Kenny.

LIGHTING

Tom Kenny had some fairly clear instructions regarding his design parameters: "They don't like moving lights," he told me, having just pointed out the 50 Icons and 20 VL5s in the rig, "... and it's got to look big." On the second count, he landed comfortably with the simple addition of an

"This is a musical resurrection without equal: where other bands have re-invented themselves, Plant and Page have picked up the ashes of Led Zeppelin and continued to forge ahead musically."

enormous backdrop (over 100 feet across for this venue) painted by Gerry Judah with mystical creatures from the Book of the Kells (an ancient tome assembled by Irish monks, chronicling the origins of what we know as the Celts).

The backdrop does indeed dwarf the LSD lighting rig - Tom's familiar use of many independently-hung trusses for the quick in/out so beloved of his crews, appears small, especially from front-of-house where it is largely obscured by the PA. But, in the darkness, the array of moving lamps, supported by 200-odd pars, two truss mounted Lycians and four Super Troupers out front, fill out the huge space defined by the drop. A smattering of Icons on the floor, with MoleMags and Black Guns, light the UV-painted cloth or the smoky air around it.

But how did he overcome the reluctance towards moving lights? "I had to tell them there

were other ways of using them," mostly, that is, repositioning in darkness. "When they asked me to do this show they gave me a lot of old videos of the Floyd and the Stones etc. They wanted simplicity, no chases or big flashes, just a big look."

So, like Dave Kobb, Tom was obliged to reach back to the past for technique, if not equipment. They also wanted something more; in the old Zeppelin days they'd never been able to see the audience and now Tom was able to rectify this with a few Mole lights around the rig and a short truss with eight Icons out in the hall. This may seem extravagant, but Tom also took advantage of the large surface area presented by the PA to project gobo patterns onto it; this enhanced and enlarged the backdrop and brought the imagery further out into the house. Incidentally, he first tried this strategy with Cyberlights out front.

Finding control of three automated lamp systems overly-complicated, he replaced them with icons, but liked the High End glass gobos so much he had them modified to fit the Icons (with a big thank you to High End for their assistance). Talking of control, Mick McHugh operated all moving lamps from the Icon board, whilst Tom directed spots and ran conventional lights from a 90-way Celco Series II.

VIDEO

Video is a big part of this show. Nocturne, under the direction of Paul Becher, rigged three screens which carry live footage and some pre-recorded images for the entire show relayed through Hughes 335 projectors. He rated these projectors, seldom seen in UK rock shows, for their in-built ability to save settings at the end of a show, thus much shortening set-up time the next day. Most of what's projected comes from two long-shot cameras at the mix position, with a dolly camera in the pit and a hand-held on stage. Like the lighting, this is not a show of flashy spivvy cuts, this is slow and considered vision mixing with an easy-on-the-eye ethos. Some specially-commissioned video (produced by Aubrey Powell) is intercut, but this is subtle footage, panoramics from Robert's home in Wales, and doesn't distract the eye from the stage unnecessarily.

The show had all the right ingredients: Robert Plant still has arms like a lumberjack, a thick blond mane and a blue-black voice, every bit the role model for all aspiring rock stars. Jimmy Page is now altogether healthier looking with a chubby rounded face which is reflected in the vigour of his playing - he is no longer the drawn and haggard man we saw in The Firm a dozen years ago. As they finished their set with a rousing version of 'Kashmir', all wailing violins and crying guitars, I'd swear I could smell its sweet essence wafting around the hall.

ROLLING STONES EXCLUSIVE - PAGE 11

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ALL ROADS LEAD TO MADISON

John Offord visits the headquarters of ETC as the company announces its plans for international expansion

Madison (population 200,000) is the state capital of Wisconsin, USA and sits 193km NW of Chicago. It is centre to a huge dairy-farming area and it's no surprise that it also has companies manufacturing agricultural machinery. Its museum and gift shops offer you no-end of black and white spotted cow trinkets. Its other listed 'industry' is medical and has strong links with the long-established University (1836) that takes up a large part of the town's central area. And just for your information, this Madison has no link whatsoever, apart from sharing the name of the fourth President of the US, with Madison County of covered bridge and love-story fame, which lies many miles away in southern Iowa.

Time will tell whether the reference books in due course show that the Madison in this feature ever gets to list 'theatre lighting control' as a highlight of its principal activities, but I can assure you things are leaning heavily in that direction. The city is home to fast-growing ETC (Electronic Theatre Controls, Inc) who are claiming the dominant position in this sector in the US and about to explode onto the scene in both Europe and the Far East.

The company is famous for its products in three main groups: the Obsession and Expression consoles (including the ARRI equivalents), Sensor dimmers and Source Four ellipsoidal luminaires. To date, they have shipped 250 Obsession systems (since 1993), 2500 Expression 1 and 2 style consoles (including ARRI types) since the launch of Expression 1 in Spring 1987, and 1000 MicroVision/ARRI Mirage desks since 1991. They've shipped over 150,000 channels of Sensor dimmers since mid-1993, and over 80,000 Source Fours have been sold since September 1993. The production is currently up to 5000 luminaires per month, courtesy of double-shift working.

Leading light at ETC is president Fred Foster, a native of Madison, and both confident and brash enough in 1975 as an 18-year-old technical theatre student at the aforementioned University, to forecast to a group of fellow party-goers attending a campus function that, with the aid of four friends, he could come up with a computerised control board for theatre lighting that would cost only \$5,000, thanks to



ETC president Fred Foster, with his employee 'wall of fame'.

the use of microprocessors. The boast was that it would have the capabilities of a \$250,000 board currently on the market.

The team pooled resources and came up with the necessary \$1,200 to purchase a disk drive and got to work in the basement of Foster's apartment, with brother Bill, a computer-wizz, dreaming up the programming ideas and Fred attending to the technical and application aspects. Needless to say, they came up with the goods, and ETC was born, although their first products eventually saw the light of day under the Colortran banner after agreement had been reached for them to package and market the desks.

The next stage in development saw ETC commissioned to design a specific parade control system for Disneyland (1979) and a year later to design and build lighting consoles for Disney's Epcot Center in Orlando, Florida. They were then free to continue the manufacture and sale of this console, and when Colortran didn't show interest, set out to develop their own market. ETC gradually developed a foothold, but it was in 1990 that

the change took place that was to spring the company into the big league when they bought the considerably bigger Rochester, New York-based dimmer manufacturing outfit of Lighting Methods, Inc.

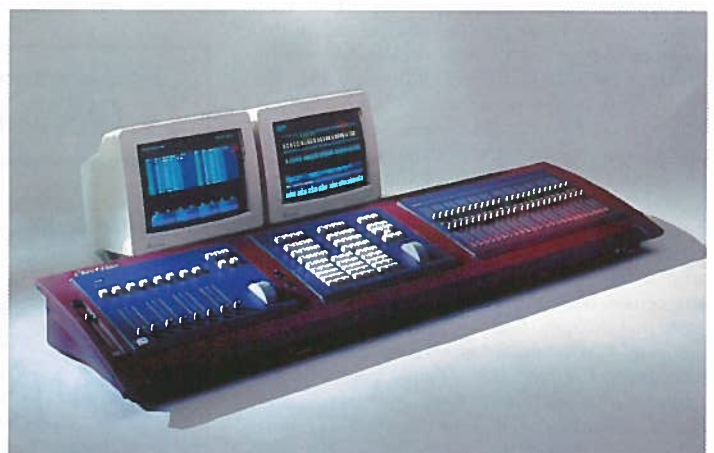
The move caused a great deal of organisational indigestion, but after six months or so, the new hybrid was sorted out, pushing ETC into dimmer manufacture in one quick move. The change was instrumental in seeing a boost in sales of ETC product from \$7.5m in 1989 to over \$35m today, and, they claim, number one spot in their market in the US.

But, despite this strong story-line of ETC's growth in the US, I have to admit that it was the company's planned expansion onto the international scene, and most particularly Europe, that hastened my trip to Madison for a look-see at ETC's operation, and a day in the company of Foster and his team. It was the company's president who had first shout.

"Part of our attitude to developing the company onto the international market - and this goes back to the involvement we have with ARRI - comes from our long-standing



The 500-channel Expression 2x. Over 2,500 Expression consoles have been sold since its launch date.



The Obsession, the culmination of ETC's 20 years of experience in entertainment lighting.



The Source Four has broken all records, shipping over 50,000 in its first 18 months.

determination to satisfy our domestic market and make sure that ETC products are never sold into a market where they were not supported," explained Foster.

"Our goal has always been to make sure that the support structure for our products is in place. When we bought Lighting Methods in 1990 and became a dimmer manufacturer as well as a control console company, we set ourselves the target of capturing the professional market in the US. Since that time, the majority of our product development effort has been aimed at developing the Obsession consoles, the Sensor dimmers, the Source Four spotlight and the Expression consoles - all of which were aimed at the top end of the market. At the same time we could be comfortably represented in world markets with our console line by our long relationship with ARRI.

"When, with dramatic sales growth, we reached the situation of a 40-50% market share in the United States, we started to approach the maximum limit of our potential expansion and this raised some serious questions, because we wanted to continue the company's growth. The vice-presidents and management of ETC are between the ages of 30 and 45 and many of them have been with us through the tremendous growth over the past few years. In buying Lighting Methods, ETC swallowed an elephant. We had accomplished a mammoth task and we were all looking around saying 'what challenges do we have next?' Throughout our organisation we have people with tremendous capacity and I want to give them the challenges that can be provided by having other managers move upwards and create a vacuum which people would fill naturally.

"These were some of the motivating factors for us to start looking elsewhere for expansion, and we're now in a position where we have accomplished our goals and feel comfortable with our place in the US market. We are ready professionally and economically for another challenge and the world market is starting to pay more attention to us. At international trade shows we've been asked when our products would be available outside the US. We felt the market was right, that we had the capacity to address it, and the desire to go after it.

"The next critical issue was to come up with a strategy to address the market. Following our 10-year relationship with ARRI it was a natural progression to make a transition between ARRI being a distributor of our products, to one where we essentially built up our own market place in Europe based on what ARRI had developed. By assuming the operations of the ARRI lighting control division we initially had the view of setting up a small operation, but

ETC INTERNATIONAL - MARKETING INITIATIVES

Tim Burnham, now director of marketing for ETC, who joined the Madison ranks in 1994 after eight years at ARRI in the UK, has a long association with the company and remembers visiting them in 1984 when it was a five-person operation working out of a garage. "All this was cornfields," he said, pointing out the 60,000sq.ft complex of buildings that now houses most of ETC's operations.

"Following the purchase of Lighting Methods, ETC set out to be the major player in the professional lighting market in the US, and there were two main thrusts of energy. One was to develop innovative products and the other to invest in service and project management. 1992 at LDI saw the launch of Obsession, and this has been a phenomenally successful console. It defined a new standard and has been supported to death with the best service in the industry - the customers say it too! The Source Four has been one of the industry's most successful products and last year we must have shipped at least 50,000 Sensor dimmer modules out of Madison.

"Following the amicable rearrangement of distribution with ARRI, we are now ready to grow into the international market. In Asia we already have a fairly good level of business in Japan and we are working to strengthen that with our agents and distributors. For the rest of the Far East we have set up ETC Asia Ltd in Hong Kong under Jimmy Cheung with David Ng on the technical side. Our determination is to provide the same level of service as we provide in the US, which I believe will be something quite new to the region. Since the launch of ETC Asia at PALA 95, this market is going like a rocket, especially in SE Asia and China, and we are already planning to build up our Hong Kong operation to about ten people by mid 96.

"In Australia we will continue to work with Jands, who have been ETC distributors for a long time, and we have just appointed Selecon for New Zealand. Both will be supported from the Hong Kong office.

"In London - for Europe - we have set up Electronic Theatre Controls Ltd, a manufacturing and service operation with Adam Bennette as managing director. Everyone who was working for ARRI Lighting Control has been taken on by ETC Ltd and manufacture of the traditional ARRI

products such as SmartRack and Reflexion, and complementary units such as wireless remotes will continue. We will also service all existing ARRI/ETC products in the UK. The company will also be a distribution operation in that we will be shipping over a regular container for warehousing in London, prior to onward shipment to other European destinations.

"Another important point is that ETC Ltd is guaranteeing to continue to support all the ARRI lighting control installations in the field, and this will be handled by Steve Vialardi, who was the chief service engineer for ARRI LCD. For the UK itself we have concluded a deal with Michael Goldberg and Adrian Hicks of Light Solutions Ltd. (see panel)

"Our sales and marketing presence in Europe will be under the ETC Europe banner. What you will see at PLASA will be ETC Europe which will exist to promote ETC products and support ETC distributors. Our first distributor meeting was held recently during Showtech in Berlin and the enthusiasm of all the people involved was tremendous. There was some concern here that customers might feel nervous about the changes, but the opposite was the case.

"The bottom line to all of this is that if we do it right then our international expansion will double the size of the company within a few years. Essentially, my job, which is hugely enjoyable, is to lay the foundations so that others can actually make it happen."



Tim Burnham (right) with Jimmy Cheung who heads up ETC Asia Ltd in Hong Kong.

upon investigation and learning more about how they were operating, the scope of the operations we have established in the UK and Europe are on a much larger scale and also encompass manufacturing.

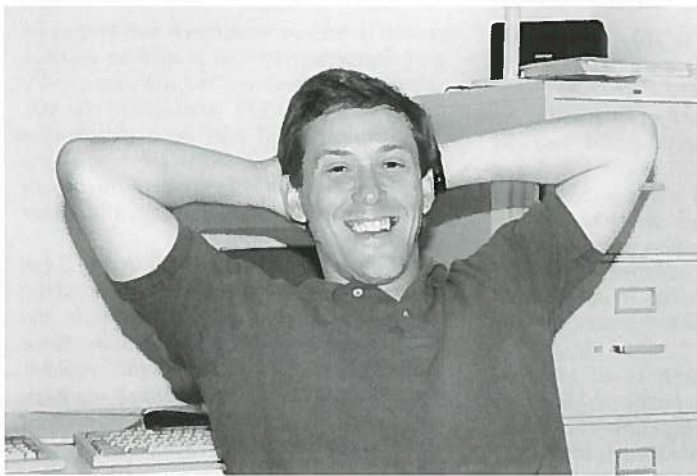
"At the same time, an opportunity presented itself in Asia whereby we had the chance to bring Jimmy Cheung (ex-Strand Lighting) into our team. He has an enormous amount of experience in that market area."

Fred Foster stepped back into corporate philosophy mode at this point, and I didn't want to stop his 'flow'. "I think that what has made ETC grow and be successful isn't just our good products, and it isn't down to any individual. The simple fact is that if you get all the best people in the industry, and where quality, service and customer care come absolutely naturally, then you have an advantage that the

other guys don't have. However, if these really good people could not be challenged and started to move on - well, the idea of watching that talent drift away is terrifying.

"As a result, our original plans for Europe and our distribution effort in the Far East changed radically when we started getting hold of individuals such as Jimmy Cheung. One of the other key factors in our globalisation is to avoid the situation where we enter into a market as an arrogant American company, and insist that the operation be structured as things are in the United States."

It is ETC's goal to organise its overseas operations in an indigenous fashion, accepting and understanding local practices and leaving the people on the spot to take the necessary decisions. "There have been very few US products that have been successful in making



John Ide is ETC's VP for R&D: "The development process here is one of the things we are proud of, and it's important for us that it's all done in-house. We have 24 people in R&D including eight on hardware, 13 on software and three on mechanical design. Extensive testing is undertaken, followed by evaluation at friendly high-profile sites. We work with cross-functional teams, and for each product line we have a team which includes personnel from R&D, manufacturing, marketing and service. It's exciting to see how people in the company react to this and the products we release. Over the next nine months you are going to see some really exciting new products."



Bill Gallinghouse is VP of sales and marketing: "The fact that Fred Foster has a production background means he understands what it means to be without lights ten minutes to show time. His attitude of fix the problem first and deal with the paperwork later exists at every level of the company when it comes to satisfying the customer. This must start at the highest level in order to be successful. We've seen many of our competitors introduce short term programmes in order to match our level of service only to abandon these same programmes in six months time due to cost overruns and resource requirements. At ETC it's not a short-term programme, it's a way of life."

the jump across the Atlantic," continued Foster, "but I believe our Expression range of consoles - ARRI's Imagination and Imagine - have been some of the most successful trans-Atlantic consoles. Tim Burnham (ex-ARRI, now ETC's director of marketing) fought to get European features into the consoles and these much improved the product domestically in the US.

"The 12 people we are inheriting from ARRI in London under Adam Bennette, including Mark Thompson on sales, are very good people, and, of course, the asset which turns out to be invaluable is the existing customer base. I feel it is a credit to ETC that ARRI has had the confidence to transfer their customer service to us. It has supported its customers well and there will be no cultural change. This is really critical because we don't want to come into the market as strangers."

Speaking of 'culture', Foster figures ETC has its own distinct brand. "Many of our people have experience in the theatre, and that's good for two reasons: you understand who you are talking to, and theatre gives you a training that you don't get at business school. This attitude is critical to the company, and it is something we will always try to maintain."

And Foster is insistent that there will be no loosening of their hold on the US market and weakening of the structure as they go for international expansion. In fact, the teams at Madison are already being upgraded and strengthened. They have a man exclusively on international quotations and another taking care of international projects. The same up-grading is happening with technical services. Training seminars continue every summer as they have for the past three years, but now with around one-third of attendees from international distributors. "The training aspects for the international market are a big part of what we have to change and develop," Foster reinforced.

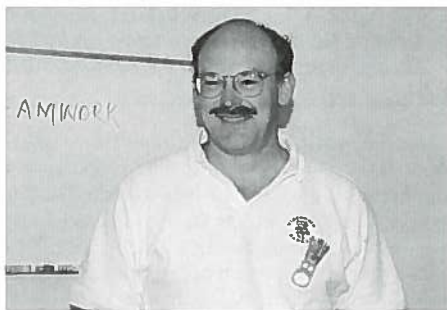
ETC now have 238 people at Madison and Foster does his best to keep all their names in his head, although admits to losing ground on occasion. To help tackle the problem, the in-house photographer hands him a regular 'test pack' of people, including the latest recruits so that his daughter Katie (9) can give him flash card tests at home. If a new position is to be created, the job description is advertised



Bob Vanden Burgt is VP for customer services.



VP for finance and administration is Margy Acker.



Dick Titus is VP of manufacturing.

internally for a two-week up-front period. "It has opened up many opportunities for people to advance within the company and given us the means of discovering talents we might not otherwise have found," he said.

"There are so many people who have been a big part of our success, and my real hope is that the same thing happens in Europe and Asia. We want to create a long term relationship with our people."

ETC Connect

ETC has now implemented its own World Wide Web site, which anyone with Internet access can freely use. They hope that this will encourage customer feedback. You can reach ETC via the Internet on <http://www.etcconnect.com>. The company can also be reached via the PLASA home page, courtesy of a hotlink.



ETC in the UK

As ETC's exclusive distributor for the UK and Ireland, M&M Light Solutions Ltd (Mike Goldberg and Adrian Hicks) will concentrate on the specialist elements of the ETC range.

Adrian Hicks (pictured above) already has a proven track record with ETC products gained during his three years at ARRI and he will now focus his energies solely on the control side of the business, while making use of the diverse strengths within the M&M Group, such as the lighting talents of Richard Rafter and the electrical skills of Roger Hennigan.

The company will continue to support the previous ARRI dealers in the UK: Black Light, Donmar, White Light and Lighting Technology Projects and the back-up that these provide will ensure operation expertise across the country. This will be reinforced by Light Solutions' 24-hour contact number (0973 - 428665) and a programme of training seminars on all ETC products.

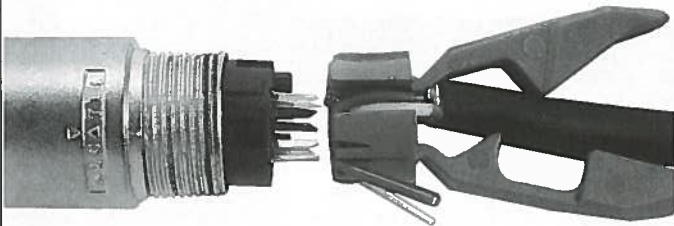
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SEASONAL VARIATIONS

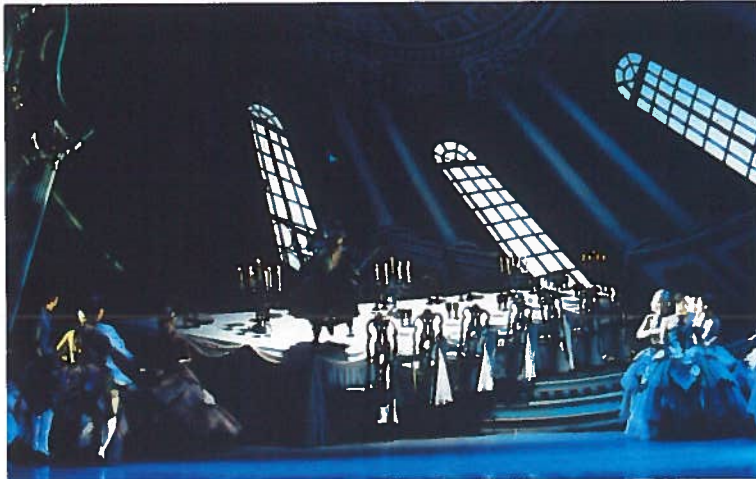
Lighting designer Howard Eaton describes a year in the life of London's Royal Opera House

A 'season' at the Royal Opera House extends from September through to mid-August, at which point the Grand Old Dame takes a well-earned three-week rest enjoying a brief retreat from the glare of life in the spotlight. The current season is now coming to its end - so where did it all start and what did the people behind the scenes have to do to get the magnificent show on the road?

Over a season, there can be in the region of 50 new productions and revivals being managed by the Royal Opera House. Each production has its own separate requirements which can change daily during the rehearsal period, with elements being added or taken out according to the refinements being brought to bear by the designers, choreographers and producers. This season, in particular, is important to the Royal Opera House as it sees the introduction of a new leaner, meaner structure, designed for efficiency and improved team building. Four project teams have been established which are to remain together from season to season. Each has a team leader, deputy and crew, all of whom are being encouraged to multi-task.

The current season sees the production of eight new ballets, 12 ballet revivals, six new operas and no less than 17 opera revivals. Opera is often more complex to light than ballet, because it tends to be within a closed set - particularly the newer pieces. The sets tend to be large-scale and heavy and present a challenge to get any light in at all! Ballet requires open space in which the dancers can move, and naturally this is far easier for the lighting designers to work with.

Generally, an opera will run for two to three weeks and will have six to eight performances over the period. Of course, performances do not run consecutively in order to preserve highly-trained voices. The mobility of the sets is therefore a prerequisite which adds a dimension peculiar to the Royal Opera House. The technical staff not only have to strike the set every night and assemble a new set for the following day, but they also have to build the entire set in eight feet sections - because that's how big the door is and how wide the lift shaft is! The ROH was not built to take the fabulous sets designed by



The banquet table, constructed in striking perspective, from *Sleeping Beauty*.

contemporary set designers and now expected by modern audiences. More to the point, it was built, for the most part, without accessible storage space. The fact that it continues to deliver the most spectacular stage sets in the world is, in my opinion, nothing short of a miracle!

It will come as no surprise that the production and technical departments are operational 24 hours a day. Overnight, the crew strikes that night's set and puts up the scenery for either the following night's performance or for a morning rehearsal. This happens six days a week, with Sundays often reserved for technical work.

The production managers will normally have the stage designs a year in advance of a show and will be planning, experimenting and prototyping for months before the season begins. However, things are rarely 'normal'. In the case of the current season, which features two of the most complex stage sets that the ROH has ever had to execute, the production department received the drawings for one of the shows, *Sleeping Beauty*, just four months before the show was to open. A combination of two factors made things difficult: size and movement. In brief, huge pieces of scenery have to move in full view of the audience, which requires an unusual amount of co-ordination of scenic and lighting effects.

The entrance of Carabosse (the wicked witch) was to be dramatic, with the scene opening to show a giant, fully-laid banquet table. The table, its contents and the chairs

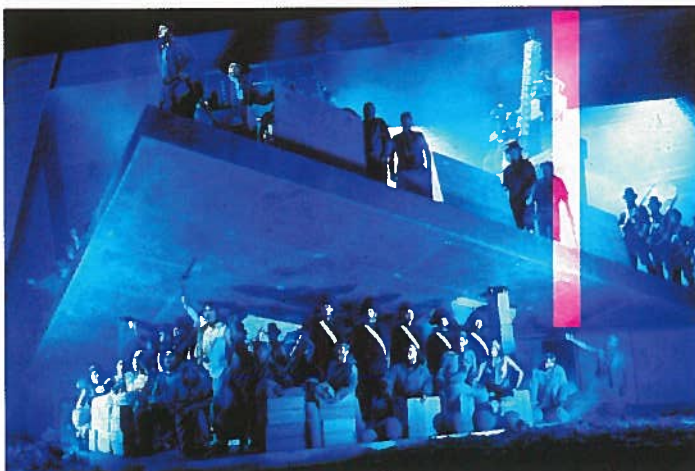
surrounding it shake and vibrate preceding the unexpected arrival of Carabosse, who emerges from under the table in a Victorian bath chair, accompanied by streaks of lightning, flickering candelabra and the sound of rumbling thunder. To achieve this, the table and its settings were built in perspective, with the table settings loosely attached with velcro. Each chair was motorised - the movement produced by a mechanism built by Paul Saunders.

Once the movement was perfected on the first chair, and approved by set designer Maria Bjornson, the other chairs were then built. The three suspended candelabra, carrying some 20 flicker candles in each, were also built in perspective, as were the four standing on the table. The overall effect was truly extraordinary. As it turned out, the hardest part of all was the assembling and dismantling of the set on a day-to-day basis.

Another key part of the set are the six columns which are used to powerful effect to illustrate the inaccessibility of the palace when everyone falls asleep. The central columns move further in towards the middle of the stage, the palace gates close across them and the front two columns tilt inwards while creepers grow around them to show the passage of time. The six column structures, each 36ft high, were built by Cardiff Theatrical Services and were carved and moulded in fibre-glass by Stephen Pyle. The columns were mounted on large structures measuring 36ft x 20ft, which would subsequently carry the hydraulics. These structures were later to be positioned on each side of the stage, operating the columns. Despite teething problems at the rehearsal, the whole set worked perfectly.

A further feature of the design is the boat which moves around the stage by remote control. The mechanism engineering was designed by Mike Barnett, one of the world's foremost theatrical design engineers (his credits include the helicopter in *Miss Saigon* and the moving bridge in *Starlight Express*).

On to more dramatic things: for the 'Awakening' scene, Maria provided a 1:25



The hydraulic platform on *Billy Budd* - focus of the main scenic changes.



The *La Traviata* set, with its four-metre glass fibre and steel lampshade.

scale model of a gigantic spider's web which was to cover the entire set. The brief was to make it dissolve in view of the audience as the Prince awakens Sleeping Beauty with a kiss. This presented two problems: it had never been done before and the 'dissolved' spider's web had to be reassembled for each subsequent performance!

David Pritchard, the production manager working on *Sleeping Beauty*, decided that, on this occasion, outside help would be needed to complement the in-house facilities. He contacted Peter Everett of Ken Creasey Limited who specialises in the production and use of scenic drapes. Creasey produced a 10ft square prototype from the artwork supplied by Maria and then, after a couple of development stages, produced the full scale 60ft x 36ft version using cloth, netting, gauze and velcro. The structure was then sent off to a painter to reproduce the web effect on fabric.

At this stage, no guarantee existed that the full scale web would work: something almost 30 times the size won't necessarily respond in the same way as a 10ft prototype. Just one day before the first performance, staged in front of Bill and Hillary Clinton in Washington, the crew were able to test the full-scale version and, to the relief of all, the web dissolved to plan.

The opera *Billy Budd*, another spectacular of the season, presented very different problems. Most stemmed from the set, built around a large hydraulic platform which, when down, is a deck and, when up, is a ship's mess, featuring a whole network of traps, hatches, stairs and ladders. The production had been staged in Geneva in 1994 and had subsequently been invited to Covent Garden; however, in the Geneva theatre, productions do not run in repertoire, so there were no eight feet doors to

deal with! In addition, the Geneva stage floor had numerous holes drilled in it to facilitate lifting the platform - something that could not be countenanced at the Royal Opera House.

None of these factors deterred the production team which, led by Geoff Wheel and overseen by David Pritchard, had not had the opportunity of seeing the show, undertaken the usual technical recce, or received a video of the production - instead they worked from a photo and a drawing! The technical team, after discussions with Mike Barnett, gave the project the go-ahead, despite the fact that they would only have one hour in which to strike each set.

Mike Barnett produced the engineering drawings and design for Smith and Forbes Engineering who built the steelwork for lifting the platform and installed the hydraulics. When completed, the whole structure went to Cardiff Theatrical Services to have the wooden cladding and painting added.

Again, the tricky part was designing the floor so that it could be broken up and assembled quickly. However, the benefit of the jigsaw approach was that the set could be used in the opera rehearsal room which allowed the artistes to familiarise themselves with the more complex movements.

Understandably, set production is one of the critical factors in the process. The general rule is that, if time permits, any painting, wooden scenery or props will be produced in-house, while anything with steel in it is usually subbed out. Special lighting effects will go out to a contractor. However, new suppliers will be given the chance to tender on smaller projects, while larger, more complicated projects will go to the people or companies with a proven track record - trust is a key factor. From a supplier's perspective, this open-shop inevitably keeps

them all on their toes, and working with the Opera House is very much a team effort.

Another unusual design of note this season includes the biggest lampshade in the world for *La Traviata*. This effect, which is four metres in diameter, had to fly in for a very quick scene change. Set designer, Bob Crowley, knowing it to be a complex effect, worked closely with David Pritchard to ensure the right effect would be achieved. Steven Pyle Workshop made the shell out of fibre-glass and steel, while ordinary Parcans were installed by the lighting department.

Finally, there came Wagner's Ring Cycle, comprising four separate operas: *Rheingold*, *Walkure*, *Siegfried* and *Gotterdammerung*. It is one for which my own company, Howard Eaton Lighting Limited, supplied the illuminated stars and custom-made discharge lights and dowsers for the opening opera, *Rheingold*. *Siegfried* features a collapsing oven which bursts into flames, and for this, Any Effects was drafted in - a company with many years' experience producing burning and fire effects for popular television dramas such as *London's Burning* and *Bugs*.

It would be impossible to cover everything, but I have endeavoured to give a view of the most spectacular and offer a glimpse at the variety during a season. And now I must retire; the productions continue, and I am looking to design a huge Catherine Wheel for a production of *Carmina Burana* at the Birmingham Royal Ballet, but that is for next season and has no place here . . .

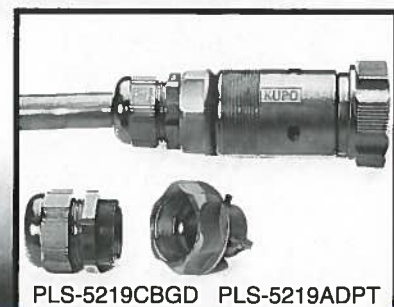
Howard Eaton is the managing director of Howard Eaton Lighting Limited (HELL), a specialist in the design and supply of special effects for the theatre lighting industry.

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EQUIPMENT NEWS

EAW's CPAA Tech

EAW, in co-operation with Stephen Siegel of Acentech, have introduced the CP621 loudspeaker, incorporating Concentric Phase Aligned Array (CPAA) technology.

To develop the system, EAW turned the conventional coaxial concept inside out: the CPAA has a large axis-symmetrical horn flare surrounding the low frequency section, which consists of a number of smaller cone transducers mounted within the flare. The advantages of this design are that the larger horn mouth opening extends the range of consistent pattern control downward by an octave, while the multiple woofers couple acoustically and provide the effective radiating surface of a 21 inch woofer. This large diameter enhances directivity in the lower octaves.

For further information contact TCi in Cambridge, telephone (01223) 416660.

Movieray from Tarm

The new Movieray from Tarm is a steerable laser-effect projector supplied with laser light by a glass fibre. The upgraded version of the Fiberay is incorporated into a housing the size of a shoebox and given the steerability and motions of a moving yoke unit. The graphic scanners deflect light beams along both axes, and Movieray's scanner module is supplemented by further laser effects including three beam effects - Art, Lumina and Ruled Grating.

For further information contact Tarm in Germany, telephone +49 2344 59070.

Slave to the Rhythm

TC Electronics have introduced the M5000X, an update to the M5000 designed to operate in conjunction with the recently launched ATAC remote control unit. The 2U rack-mount offers the same software and hardware upgrade and expansion capabilities.

For further details contact TC Electronic in Denmark, telephone +45 8626 2800.

AT Smart Mixer

Audio Technica have launched a 'smart mixer', named the AT-MX341a, which is capable of managing a maximum of four microphones. Units can be daisy-chained to operate multiple additional mixers and microphones. Any number of units can be used in the link, making the mixer ideal for large conferences and outdoor events.

For further information contact Audio Technica in Leeds, telephone 0113-277 1441.

HELL's Dimmers

Howard Eaton Lighting Limited (HELL), has launched two new radio control dimmers.

The dimmers come in both DWM and DC formats and have been designed to remain compatible with the previous radio control systems. A lamp test button has been added, facilitating local testing without the need for a radio control signal. Indicators to show power, signal and fault presence have also been introduced. The DC version features all of the above and has been specifically designed for DC applications and may be used to control the popular flicker candles, as well as other applications such as switching relays and motors.

For further information, contact Howard Eaton Lighting in Lewes, telephone (01273) 400670.

Mushroom Truss System

Mushroom Lighting have launched an updated version of their Clear Span trussing. Using Slick Mini Beam and Lite Beam, the modular system is suitable for most outdoor situations, such as university and college events, especially where the ground must be left undamaged. The free-standing unit measures 25m x 21m x 7m high, and can be used as a cover for a stage area.

For further information contact Mushroom in Northampton, telephone (01604) 790900.

Starlite DMX Upgrade

Starlite Systems Technology, manufacturer of robotic luminaires and software packages, has upgraded all its equipment to incorporate a DMX interface. Now all Starlite lighting equipment can be controlled from a single desk, removing the need for dedicated desks and equipment.

Starlite have also announced the introduction of a new control desk for its range of moving lights. The desk physically incorporates the PC, making it lighter and more compact. The first of the new desks was sold to Yamaha in Japan earlier in the year.

For more details contact Starlite in London, telephone 0171-511 4400.

Out Board's Octopus

Cambridge-based Out Board Electronics have launched the Octopus automation package. Specified for automated control of signal distribution to loudspeakers in complex theatre productions, Octopus allows up to 1000 set-ups of level and routing configurations to be stored to memory and later recalled by MIDI, RS232 or at the press of a button.

For further information contact Out Board Electronics Ltd in Cambridge, telephone (01223) 837827.

Quartet Controller

Mode Lighting (UK) have released the Mirage Quartet architectural lighting controller. The Quartet is an easy to programme, four channel, four scene controller with manual adjustment of any channel or scene. It can be used in conjunction with Mode's range of dimmable power units, rated from 6A to 10A per channel, or used directly to control HF regulation ballasts for fluorescent lighting. Slave plates for multi-position control and infra-red systems for wireless control are also available.

For further information contact Mode Electronics in Ware, telephone (01920) 462121.

SOUND

In addition to Lighting+Sound International, PLASA also publishes Sound+Communication Systems International, a bi-monthly magazine aimed at the sound installation, reinforcement, audio-visual and multi-media markets. If you would like to receive a sample copy of this publication, together with subscription details, call us now on (01323) 642639

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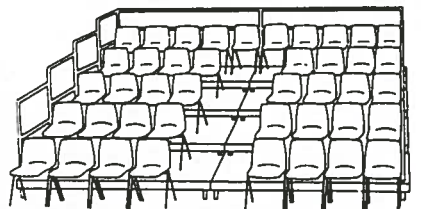
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SEARCHING FOR SPACE

Ian Herbert at the Prague Quadriennale

What is a triga anyway? There's a golden one on offer at the Prague Quadriennale of Theatre Design and Architecture, and Britain won it at the last one in 1991. I went out to look at the latest of these remarkable shows and wrote this account before knowing the judges' choice for 1995. Rather than be wise after the event, I've left my version unchanged - you can compare my views with those of the judges at the end.

Every four years the world's theatre designers and architects come together in the Czech Republic to swap stories, show off their work and compete for the Golden Triga. The Prague Quadriennale is the only event of its kind in the world, a huge international clearing house of ideas and images that offers you glimpses - sometimes inspiring, sometimes tantalisingly incomplete - of what's going on both in countries you thought you knew well, and in ones you may never visit. There's such a wealth of material that the determined truth-seeker could spend the whole three weeks of the exhibition in Prague's Palace of Industry without unearthing all its treasures.

There are set models and sketches - even actual sets, or parts of them. There are costumes and costume drawings, a profusion of props, architectural models and sectional drawings, and, of course, photos by the thousand. There are sound tapes and videos, computer simulations, stage and exhibition lighting of all kinds from the lash-up to the height of luxury.

The work that goes into an exhibition of this size is enormous, and you have only to scrape its glitzy surface to find a score of stories of frustration and failed ambition. Even big countries can find it hard to put together the money and materials for an impressive display: designers are not noted for storing their models uncannibalised, or keeping a neat archive of drawings and photographs - most of them are too poor, too busy, or both. Design minutiae are difficult to transport, and even in this world of fewer frontiers, their arrival can be unpredictable. The British stand was a mere two days late and when I left Prague the Mongolian stand had got as far as Moscow. (Maybe one of their yaks went lame). France and Italy didn't even decide to exhibit. Little of this showed when Vaclav Havel, playwright president of the Czechoslovakian Republic, sat in on the grand opening, but right up to his arrival there were Americans firing in staples and Japanese painting floors.

The theme for the exhibition, indeed its subtitle, was *In Search of Theatre Space*. As well as having a whole mantelpiece of subsidiary prizes to give out, the dozen 'international experts' who make up the judging panel were looking to give the Triga to the exhibit that best stated this theme. (There was a suggestion, not entirely frivolous, that it should go to the Azerbaijani stand, a last-minute cancellation that was represented by a pleasantly empty area). The idea is a useful catch-all, since almost any theatre design is, by definition, an attempt to make the best use of space - and so of course is any architectural project. There were, however, some countries who took the idea seriously, and theirs were among the most satisfying of the exhibits.

The big question, whether or not you have the money to answer it well, is to what extent your stand is the exhibit, and to what extent it is simply the best means of displaying your



Hungary's set design exhibit featured a life-sized double tier of gilded theatre boxes.



Kendra Ulyart's corner of the UK exhibit.

theatre work. Do you produce an outward-looking display that gives a clear 'come and get it' message, or do you close it off, relying on the visitor's curiosity to draw them in to explore your hidden treasures?

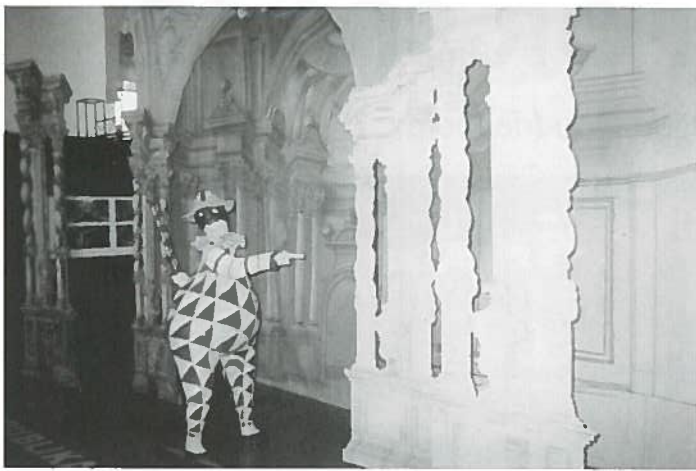
The British chose the introvert approach, boxing in a condensed, travelling version of the splendid Make Space! exhibition staged in Manchester last year (see L+SI, Jan 95). The metallic exterior, with its graffiti and dustbins recalling the 1991 Triga-winner, was a development of Paul Kondras and Ashley Shairst's installation, a glorious peep-show corner, enclosing a mock-up designer studio where various talking heads on video discussed the state of the art. The rest of the stand followed the Manchester aim of showing design in action for different types of performing space, from proscenium to public park. There was less attention to the design of theatres themselves than in the original exhibit, partly due to the reduced floor area and partly because some of the best models (and some of the show's title) were nicked for the British Council's touring architecture exhibition, Making Space for Theatre, which was having its overseas premiere in Prague's architects' club at the same time as PQ.

What stood out from the British exhibit was the relative youth of the designers on show: apart from Fairy Godmother Kate Burnett (who put the original show together) and Queen Bee Pamela Howard (who was Britain's official organiser for PQ), nearly everyone else must have been fairly close on either side of 35. This range still gave visitors the chance to check out Ian MacNeil's celebrated *Inspector Calls* set for the National, as well as Tim Hatley and Rae Smith's work for Complicité's international tours and Kendra Ulyart's busily jumbled corner of sets and costumes for the RSC's *Beggar's Opera*; but they could also discover bright out-of-London newcomers like Kate Borthwick, showing models for TAG Touring; Patrick Connellan, with his enveloping set for *Atheist's Tragedy* in Birmingham; Christine Marfleet, offering a super series of models for Theatr Powys; and Francis O'Connor with his eerie Dublin *Silverlands* and an imaginative, highly functional *Pirates of Penzance* out of a box for an open-air performance in Saltburn, Cleveland. Lighting designers like Rick Fisher and Michael Hall got their share of the credit, too, and it was noticeable that great care had gone into improving the exhibit's lighting, using stage spots and birdies, in preference to the occasional wobbly angle-poise and a couple of neon tubes, as seen on some other stands.

In contrast there were those which made a big external statement. The Bulgarians had built a huge pink gauze creature, very like a whale, into whose belly you went (at risk of tripping over some rather disgusting latex extrusions on the floor) to examine their design display.

Chile had brought an easily-transportable ramp, with most of their work simply shown by big colour photographs on its floor - a very neat way of inviting you in to a full exploration.

Slovakia had a ramp, too, but carrying only a series of benches leading to a video display. At least the benches were very welcome to the tired visitor, though you couldn't actually see much of the Slovak's main exhibit from them. China had a miniature Great Wall (what else?), a handy peg for some fascinating models including Xinglin Liu's adaptation of an old wind-up gramophone for a play of nostalgia, *Declining Years*. Photos showing the theatre's



The exterior of the Czechoslovakian stand, complete with Punchinello.



Chile's ramp of photographs inviting further exploration.

proscenium as the gramophone lid and a tilted disc stage as its turntable, proved this was more than just an elegant designer conceit.

The Catalan stand - sorry, the stand for Spain (Catalonia) - was light, bright and open, as befitted one showing costumes and big models for three huge outdoor shows mounted by companies such as Fura dels Baus for the Barcelona Olympics. A giant video showed these colourful designs in action - and what action. Lifesize costume was the main weapon of attraction for the Finns, with a striking red on black display of Jyrki Seppä's work for *The Wizard of Oz* on the outside wall, and some rather less interesting mannequins for Anna Kontek's *Chant du Rossignol* inside. There was also a good set of panels on Eero Hyvämäki's Helsinki Opera House, up and running at last. The Czechs also used a big exterior statement, with a life-sized Punchinello inviting you into a rather uninspired interior: this was made interesting only by a fine display, in models and photographs, of theatres old and new, from the magnificently restored castle theatre of Cesky Crumlov, to the technically fascinating metal theatre, the Spiral, inspired by Frank Lloyd Wright's Guggenheim Museum, which was exhibited as a project in PQ 1991 and is now up and running in the grounds of the Palace of Industry itself, playing *Jesus Christ Superstar* as it happens.

Other countries, like Britain, relied more on drawing you into their stands. The Germans didn't even bother to finish off the outside draping of their two-storey, open-ended grey box, but the stand itself was meticulously finished, with a series of filing-drawers on the left downstairs wall opening to reveal portfolios of the four designers on display. Behind unmarked doors on the right wall were three-dimensional cabinets of curiosities for each of them, but only Frank Häning's costume sketches made much of an impression. On the top storey, an equally spartan layout gave visitors the chance to see the four's designs in action on video.

Content was rather overwhelmed by presentation on the German stand, but the Poles managed to combine atmosphere with display in their typically murky, earthen-floored labyrinth. In the carefully lit gloom, constantly changing, the costume work of Zofia Anna de Ines in particular, made a good impression. In strong contrast to Poland's dark, watery caverns was a characteristically clean and dry Japanese stand, with photos displayed at eye level above set models on columns in the centre of the stand seems a bit of unnecessary overstatement, until you discover that sitting on its edge brings the models to your eye level. Neat and successful in a minimalist way.

Minimalism was the keynote of a number of national exhibits. Russia's small stand, hung with racks of black linen anoraks, was based entirely on an installation by Sergei Barkhin for the play *Goodbye America*, offset only by two unpainted, but beautifully detailed, wooden models - one a set, the other an architectural project - and a single costume display.

The Slovenes, too, took elements from only two of Meta Hocevar's stage designs to make a good frame for a continuous video display of work by 25 other designers, among them Sanja Jurca Avci whose work is known to London Fringe audiences. Lithuania's lone designer Jonas Arcikauskas showed set and costumes, plus a huge dead prop horse, for one show only - Strindberg's *Dream Play*.

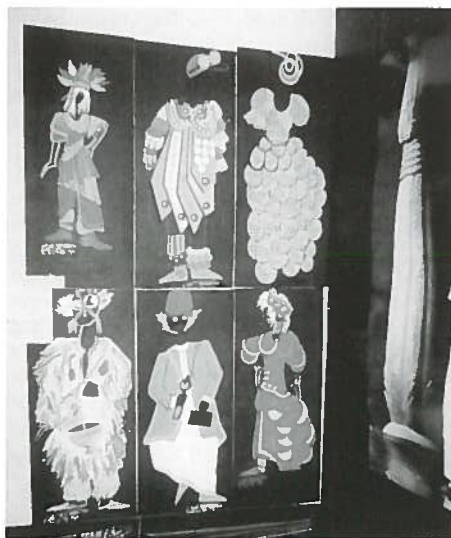
Denmark's display was also devoted to a single production, Hotel Pro Forma's minimalist opera *Operation Orfeo*, but its careful and well-mounted presentation of all the design elements, plus an informative brochure, made you really want to see the show - which indeed looks like promising export material. Iceland's Gretar Reynisson had a one-man minishow, four giant production transparencies forming a central cube inside a white box, with a representative chair from each play against each outer wall. White walls were also the choice of the minimalist Mexicans and the Latvians: the latter broke up theirs with powerful black line and a cartoon of a howling dog, a striking container for a handful of rather good set models. A one-man show was the order of the day for Sweden, but Soren Brunen had managed to cram no less than 30 of his often imposing set models into a single tall plexiglass column that repaid serious study. Greece, too, devoted its stand to the work of a

single designer, Giorgos Patsos, some of whose monumental work for *Epidaurus* stood out.

Some simple, but carefully conceived, exhibits could be passed by very easily, but well merited a closer look. Inside the darkened Dutch stand, for instance, you saw, at first glance, only a couple of rather indifferent stage settings, but closer inspection revealed that these were two versions of the 1:4 scale model theatre inspired by the late, much lamented Steve Kemp as a test-bed for lighting effects. In each, a full miniature rig was in use, plotted by Reiner Tweebeeke, showing the possibilities of different lighting states. Likewise, you wondered at first glance whether it was really worth the effort of the Swiss to build an all-enclosing polished wooden box to house just one rather complicated-looking model. But the model is Werner Hutteli's *Faust-World-View*, a 3D attempt to explain both the great Goethe's still fascinating theories of space, form and colour, and the more recent work of Philipp Otto Runge in developing a colour sphere. Pretentious, possibly, but worth a very careful inspection - hence the almost monastic lectern and a single chair placed in front of the model for the seeker after aesthetic truth.

Belgium chose a dramatic, open-fronted stand to present another very selective exhibit. A raked dining-table (with a nasty-looking, giant papier maché turkey carcass suspended over it) carried place-settings for their three featured designers, Jan Fabre, Nick Kortekaas and Jan Versweyveld, while at its head a video showed their work in practice. It would take some patience to want to watch it all, but meanwhile you could enjoy the side-panels showing half a dozen theatres recently built or restored in Belgium, including Antwerp's Bourla and Ghent's Flemish Opera. These were set in a positive sea of empty wineglasses - perhaps a comment on the entertainment priorities of Belgian audiences.

As well as these carefully thought out stands there were a number which stood out simply because of the quality of the work they showed. An undistinguished American shell nevertheless made a fine backdrop for the work of Broadway designers such as our own Tony Walton, as well as Ann Hould-Ward and William Ivey Long, with well-finished set models and plenty of actual costumes. Likewise, the Canadian stand gave good space to exciting work from the likes of Michael Levine and Cameron Porteous, with models imaginatively, but economically displayed on their own packing cases, while the Quebec corner made use of Spiralift columns both to support the models and demonstrate this cost-efficient piece of stage machinery in action. New Zealand's clinical display included an absolutely smashing model,



Varied costume designs from Egypt.

complete with ambient sound, from Dorita Hannah for (wait for it) a Maori adaptation of Ibsen's rarely-seen *Vikings at Helgeland*. Korea and Hong Kong had some ambitious models, Romania did some world-famous productions rather less than justice with a display that obviously suffered from lack of money. Israel crammed as much as it could into a showbizzy setting, Syria's exhibit was literally a treasure-chest of models and drawings, and a charmingly cluttered Estonian stand made a strong statement with its welcoming cluster of puppets by Gunta Randla for the charmingly-titled TV series *Crudgy*.

The Belarus exhibit was a fine display of high-class craftsman work coming from another country whose theatre few of us will get to see: I particularly admired the meticulous and imaginative models of Zinoviy Margolin, including one for *Dürrenmatt's Visit* which had a strong (and I'm sure quite unconscious) echo of Ian MacNeil's *Inspector Calls*. In the case of some countries, the effort to be there was impressive enough in itself: it was good to see even a few simple photos from the Philippines, and some rather colourful costumes from Egypt, and deeply touching to see photos on the Croatian stand of the rebuilt National Theatre in Osijek three years after it was bombed to bits.

I've left my own two favourites for last: Brazil had a very big stand, almost deceptively so. After admiring Eleonora Grigoruk's rich costumes outside the stand, you could spend a long and happy time weaving your way around its tree-lined interior, devoted to three very different, but seriously talented designers, José de Anchiela Costa, Daniela Thomas and above all José Carlos Serroni, whose panoramic work for the Macunaima troupe got the full treatment it deserved. Here is a designer who can work

with highly political themes like Andrade's *Path of Salvation* or epic myths like Antunes Filho's recent *Gilgamesh*, yet also put a site-specific spin on classics such as *The Seagull*. Models, costumes, photos and even storyboards in profusion support this strong statement, with Costa throwing in half a backcloth for good measure.

The other stand that I admired enormously was that of the Hungarians. Its face-on display was a life-sized double tier of gilded theatre boxes around an arc of real turf - not just an exhibition come-on, but part of Csaba Antal's set for *Hello Tolstoy*. Inside this were two superimposed corridors of cubicles, ideal for displaying a good selection of current Hungarian design, much of it excellent, including the work of the two Khells, Csorsz from the Katona Jozsef and Zsolt from Kaposvar. Even the back of the stand was turned into an opportunity for a further attractive display, this time of large, free-standing costume designs in two dimensional mock-up. Was the display 'in search of theatre space'? Maybe not, but it was at the very least a most attractive and highly functional piece of work.

As if all these national displays weren't enough, the exhibition's central hall was given over to a thorough and awesome retrospective of 50 years' work by Jozef Svoboda, Czech stage and lighting designer, innovator extraordinaire and a man whose influence has resonated throughout world theatre during the whole life of PQ. A third hall showed a modest book exhibit plus - looking to the future - the work of design schools from a score or more countries. Some, like the British stand, were pretty basic careers-convention stuff. Others, like the Dutch and Finnish contributions, gave their elders in the main competition a good run

for their money - the Dutch students had almost the same two-tier structure as the German national stand but made it twice as interesting. And I can't finish without mentioning the trio of Swedish students who built a plexiglass box, filled it to knee height with plastic balls in yellow and blue (Sweden's national colours) and invited visitors to plunge into it from a waist-high diving board - an invitation that was accepted with much shrieking and laughter. On the stand's back wall a notepad asked for 'your comments on the state of theatre today'.

After a couple of days touring the riches of the 1995 Prague Quadriennale, there's no way of succumbing to the temptation to describe it as a load of balls, whatever their colour.

THE JUDGES' VERDICT MAJOR PRIZEWINNERS OF 1995

OVERALL

Golden Triga: Brazil

Special Gold Medal: Britain

STAGE DESIGN

Gold Medal: Robert Ebeling, Frank Hänig, Hartmut Meyer and Peter Schubert (Germany)

Silver Medals: Andris Freibergs (Latvia), Jeoung-Sup Yoon (Korea)

Honorary Diplomas: Japan (exhibit), Reiner Tweebeker (lighting design, Holland)

ARCHITECTURE

Gold Medal: no award

Silver Medals: Czech Republic, Belgium

Honorary Diploma: Croatia

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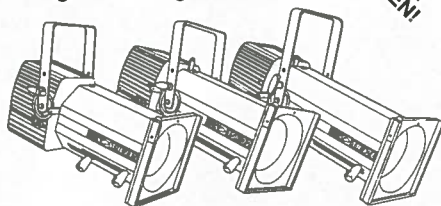
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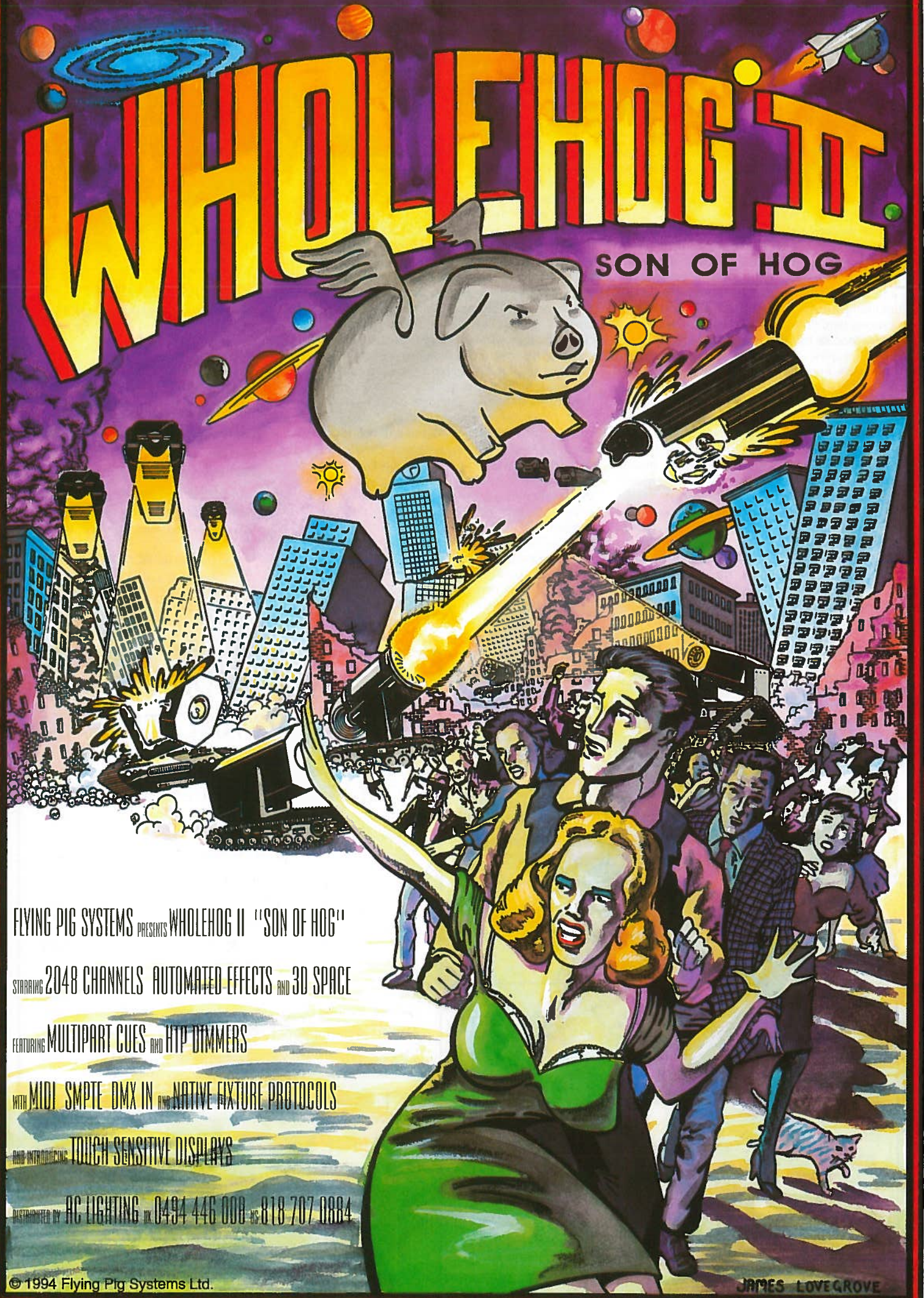
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SON OF HOG

Richard Knight looks at Flying Pig Systems' long-awaited new console

As most of the industry knows, the Wholehog was unveiled at PLASA 92, winning the Best Product Award. Not one to rest on their laurels the company behind the desk, Flying Pig Systems, continued to upgrade the software over the following 18 months. The company sought to include items that end-users thought useful, as well as those refinements that they decided should be incorporated to complete the console's potential - MIDI, Timecode and Macros, etc.

As a result, the console's reputation has gone from strength to strength - although, admittedly, from a flying start! The Wholehog became the solution to the problem of how to deal with weighty DMX-based rigs, and consequently allowed DMX lights to be taken seriously. Its credits read like a roll-call for most of the major rock 'n' roll and 'event' shows in the last three years. Then against all predictions, Flying Pig Systems suddenly stopped making them!

An interesting consequence of this decision was that the second-hand consoles were changing hands for considerably more than their original cost. Flying Pig Systems had appeared out of the blue (well, the Rave scene, actually), made one of the best lighting products ever, and then declined to continue making it. For those who have been wondering why, the answer is quite simple - they wanted to make an even better console. Why not? It's a free world.

It may be worth noting, that where such choices are possible, the average gap between one's first and second born is about two-and-a-half years. It appears to be part of the human condition that around 15 months is the length of time that people take to forget how horrendous an experience was the first time round, and begin to contemplate doing it all again. This seems to apply to Flying Pigs too. Hog hormones! There was no plan to take 15 months to produce this second offering - indeed, the exterior of the console, along with apologies for the delay, was on display at PLASA last year. It's so common for consoles to be overdue, particularly since the advent of automated lighting, that this is now not worth taking issue with. I suspect that any console manufacturer getting a product out on time and claiming an easy birth, is being economical with the truth and has, more than likely, produced an unusable duff. Flying Pig Systems are certainly now acquainted with the fact that the second time around is as hard and as fraught with difficulties as the first.

The company have, after months of considerable effort, made some functioning consoles, so after a lengthy gestation period, the answer to solicitous enquiries to the overwrought parents 'when is it due?' has changed from 'soon' to 'now'. Son of Hog has arrived. Given the background of the company, it was fitting then that the console's debut outing was at a Rave.

Automated lighting has now been around long enough to have a history of its own, and for that history to begin repeating itself. Often, a company's first offering breaks new ground and is very successful, whilst the second is



fundamentally re-thought. Vari-Lite spring to mind with their complete restructuring and consequential leap forward with the Series 200, from the original VL1 system. Flying Pig have gone through a similar process and for a similar reason - processing power. The fine detail of what we get in the future is, as ever with automated lighting consoles, a matter of tweaking the software to suit the end-users' views and to incorporate more developments. Indeed, we now expect software development as a matter of course, and for it not to occur, precipitates a console automatically heading towards obsolescence before its time. Defining and refining the user surface until it satisfies all concerned is part of the finalisation of an automated lighting console. What has to be right to begin with are the fundamental principles over which the software is moulded - get the body right and then fit the clothes. It was felt by the Hogs that it was impossible to take the Wholehog I beyond a certain point, because the fundamental structure of its processing capabilities would not allow it. With an eye on the long-term, a major re-think and re-build from scratch was deemed necessary for the successor, and, in part, this accounts for the delay.

This long-term view is also reflected in the quality of the design and build. My electronics knowledge was learnt parrot-fashion as a VL1 tech years ago, and consists of telling the difference between chips and fries (these latter were the smelly burnt chips that needed replacing). Despite this limited knowledge the internals of the Son of Hog certainly look the part to me, with very neat circuit boards and not a lot of them. It appears very robust and roadworthy, but time will be the ultimate judge.

Research has shown that, despite the number of major shows the Wholehog has been used on, the 1,000 DMX channel mark has rarely been exceeded. (The Clothes Show Live 94 did manage a total of 2,000 channels on two Hogs). Thus, the 6,000 channels on offer from the desk

has been deemed excessive, and lowering it to 2,000 has allowed the new processing power to manipulate these channels in a very sophisticated manner.

Son of Hog is a much smaller and lighter console than its Dad, weighing in at 48lbs, which is just about a one-man lift (although preferably, not me), and is 26" wide by 23" deep. It would look comfortable in a theatre lighting booth, being a similar size to a Mini Artisan or Compulite Animator, and I would be surprised if some don't end up there in due course. The 2,000 channels come out over four outputs (when there is a demand, these will be bi-directional). On the rear of the desk is a DMX input for external triggering from another device, a timecode input (timecode

handling has yet to be written), a printer port which thespian types will no doubt use, mouse and keyboard sockets, disk drive, two external monitor outlets and an expansion port for a possible future extra wing. The on/off switch and soft reset button live at the back, as does the mains input which is universal power - any mains volts between 90 and 260 will do. The disk drive is where the show is backed-up too and where the fixture library is loaded in. There is no hard drive, as on the Hog. Storage is to RAM, which is powered by mains, the battery being trickle-charged when the console is powered up, holding memory for about a week in the event of a mains failure (or sitting in a warehouse). If the mains does fail, nothing is lost, so you will not have to reload your show from disk. The wise will back-up to disk reasonably frequently during programming - it is very quick to make a save.

The front of the console has eight playback faders, a manual fader, GM, chunky 'Go' and 'Back' buttons, assorted buttons to programme with, an excellent and well-thought-out keypad (which operators of LP90s and similar theatre boards will feel comfortable with), including cursor move keys, two large touch-sensitive screens, complete with back-light adjustment and a row of 10 buttons above each of them, and three wheels with the four palette buttons below them. There is no external 'brain', so the only additional space required is if one wishes to use external monitors. I would imagine that with the excellent on-board screens, there would usually only be justification for one, but followers of the NASA space cadet look probably need no justification at all and may plump for the two.

The original Wholehog's 'brain' is a separate unit with the monitor in-built - and a minor problem is that it cannot be re-angled. If the brain is on the same level as the console, the monitor is too high for sitting down and too low for standing up, so programming can involve a rather curious bobbing action between console and monitor. This knee exercise will no longer be necessary with the new console, as what one needs to see will be on the two on-board screens and, if chosen, the external monitors, which can be angled to suit.

There are no hard group or palette buttons at all. All these are now 'soft buttons' on the touch-sensitive screens. One of Son of Hog's

triumphs, and what must have consumed considerable time in its creation, are the copious visual displays. These can be sized and positioned using some of the 10 buttons above the right hand screen and recorded as presets on one of the 10 buttons above the left hand screen. One can have a palette display for initial programming on one display preset button, and a useful timing display set up recorded on another, with a big contents read-out on a third, etc. You can choose which displays appear on which monitor, but a normal set up would have palettes on-board on the touch-sensitive screens. For those with fat fingers or an aversion to touch sensitive screens, most programming actions can be performed via the keypad or, if preferred, the mouse.

At first sight it looks as though Son of Hog has taken something away by drastically reducing the number of hard buttons, but it quickly becomes apparent that this soft approach actually increases what is instantly accessible and with less hand movement. One display button could get you Groups, Focus, Colour and Beam palettes all displayed at once, offering in one view 80 soft buttons, which is far more than the Wholehog's hard buttons.

These palettes no longer have to be made by the user but are contained on the fixture library disk that is now the console's start point. Upload the fixture library, tell the console how many units of what type you are using and the palettes are automatically provided. The whole masking or function filtering issue is done for you. It is possible to adapt and add to the palettes provided if one's units are customised, for example. There is a user controllable mask, so if you wish to add to a palette a colour plus beam look, that is easily achieved and, as ever, palettes can be named. It doesn't come much easier than this!

Patching needs to be obvious and intuitive for the simple reason that one does not get to do it much. Practising programming is a good thing: practising patching is not - it would be the lighting equivalent of train spotting. A show with 1,000 very complicated cues has only been patched once. An experienced operator with 500 shows under their belt may never have even looked in the patch. Son of Hog's patch is done from the keyboard and is a model of logic. It is very 'conventional lighting' oriented and its simplicity works well. Pick one of the four output lines, pick your fixture type, type in the start number on the keypad, hit enter and hey presto, they are patched. Pick a line, pick the next fixtures, type a start number, hit enter . . . I believe I can manage this without looking at the manual!

With a big rig, a lot of information has to fit onto the contents display and a full-sized version of this would be a good main use for an external monitor or two, although it is readily available, albeit smaller, under the contents option on the stack display, positioned above the playback faders on the left hand screen. As with the previous model, there is a lot of naming and labelling that can be done with both stacks and the cues within them. The contents display does precisely that, with different colours for what is going up and what is coming down in level - very conventional! In due course it will display activity as it happens, theatre style, with rolling numbers. It displays changes - parameters that are being specifically addressed in the cue being questioned in black, and parameters previously addressed sometime in the stack or sequence in white.

This 'previously addressed sometime in the

stack' issue brings us on to a fundamental with this console - it is a tracking console. In 'Wholehog' speak, it is as though 'Build' is permanently on. It is recording changes only. If there is a possibility that you may move into a stack or sequence from an unknown or different cue than would normally be the case, then programme the first cue in the stack to be full parameter. That is to say, every function has had an information input and been defined. This is probably a good start point every time. From then on, only the parameters you change are recorded, helping to save processing power and making for less programming effort. If you jump into a stack halfway through, something only likely during programming, then it will

"Son of Hog may have been late, but in many aspects it is way ahead. Flying Pig Systems have done it again. Fasten your seatbelts - another Pig is flying, and this one's much prettier."

give you all the previously addressed parameters in that stack automatically over a pre-defined time - clever stuff! This removes the only real objection and flaw to tracking in that you do not have to manually go to a known 'all parameters defined' start point and punch through to pick up preceding information to achieve the true look.

The area of timing is something of a hole in the Wholehog, and is one of the major reasons the Hog gentlemen went back and started from scratch. Son of Hog has the most sophisticated timing I have ever seen on any console and, along with the excellent displays, this is where a lot of the new processing power is applied. In the options window for each stack there is a menu for defining the response of the fader and flash button. This is where a stack is defined as a sequence or a chase with the usual chase options of beats rate, direction (including random) and crossfade rate.

There is also a user definable global time which is defaulted to two seconds and applies to a stack on a page. This means cues will automatically have a time of two seconds given to them unless another figure is chosen. This can be chosen as a different time for other faders on the same page and the same fader on the next page. Incidentally, as many pages as you like are available. This will also be the time a jumped-into stack will take to gather up all previous information and the time a Go Back will take to complete. This default immediately allows one to see the effect of timing when trying out a cue, unlike the Wholehog, which bumps cues until time is specifically added.

On the cues in the stacks, there is a choosable wait time, a follow-on option, very useful for marking units (presetting without intensity) and a halt or stop to await a manual Go. One can also add a 'Man' instruction and that cue will be attached to the manual fader and will occur over the time taken to move the manual fader. So far, so good.

Where it becomes excellent is that a cue can have as many parts as one desires! It is possible to divide each function of a light into a separate part. It is also possible to separate each individual light into a part. Cyberlight 1 can have an intensity part, a move part, a colour part and the various beam functions all as separate parts. Cyberlight 2 can have its own set of parts. Each of these parts has an active time including points of seconds, a down time applicable to intensity and a delay time. The fundamental shift here is that the delay time before starting the next part, starts counting

from the cue Go (start of part one). It is therefore possible to have multiple parts overlapping. Further, it is possible to have, say, part 24 of cue one still doing its thing, having moved on to cue six. The potential here is huge, as is the amount of processing work the console is undertaking. Self discipline will be called for to avoid drowning in a sea of complexity and confusion of one's own making.

There is an amazing degree of elegance available now in the timing area, but if one does not have the time on a particular show to delve deep, one is still free to choose simplicity - at its simplest, one-part cues using the default time setting as the norm and adjusting from that. A cue is built in the same basic way as on the

Wholehog: grab a group of fixtures, give them some function information (most easily done from the palettes), either add parts and timing now or later (if later, the cue will be in default time), decide to record, choose where to record to and then confirm it all by pressing enter. Straightforward.

As with the Hog, enquiries as to 'how many this' and 'how many that', are met with answers of such high numbers that there is no purpose bothering to remember them.

Son of Hog comes across as a much tighter and controllable console than the Wholehog. The price paid for this tautness is that it is less open and buskable, which is where some Wholehoggers might feel deprived of the facilities that were over on the left and may opt for the extra wing when it becomes available somewhere down the line. Those new to Flying Pig Systems and their underlying thought processes, and this will constitute most of the Son's new users, won't miss what they don't know. The pin-point precision available from the timing side of Son, along with its multi-parts ability will open up new areas for this console.

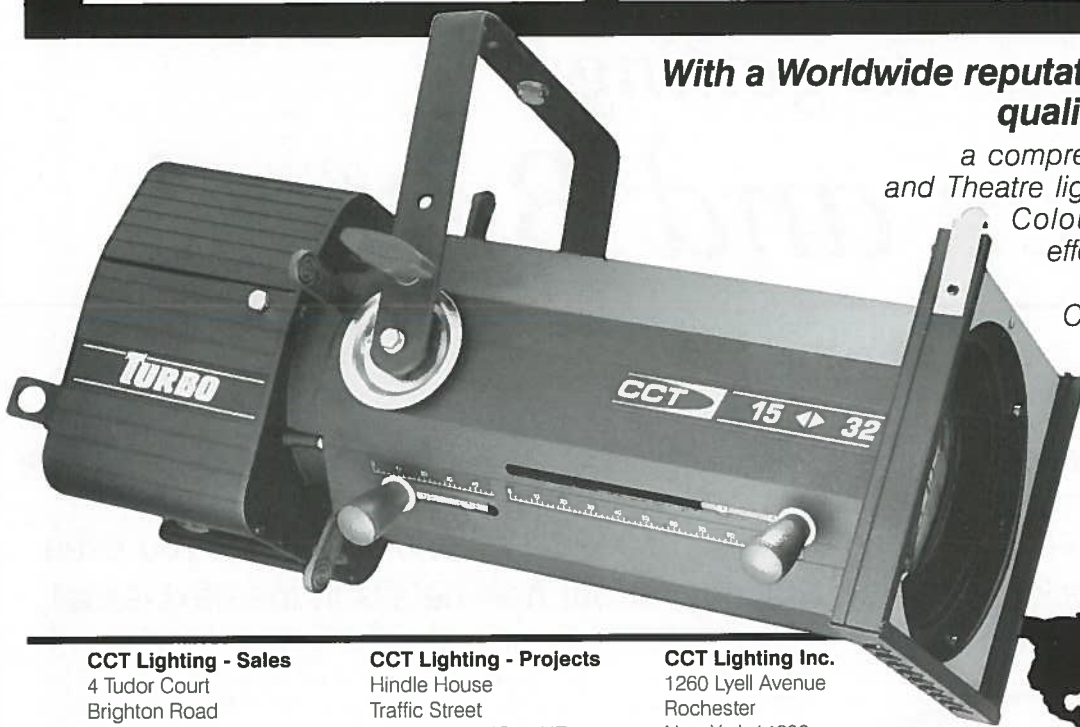
Although it is designed as an automated lighting console first and foremost, its handling of conventional lighting seems so capable that those with primarily generic lights to control (and DMX dimmers are becoming pretty normal), ought to take a serious look at what it has to offer, which includes control of scrollers and colour faders and obviously headroom to add automated lights to their system in due course. Luminaire manufacturers using whatever protocols of their own devising ought to make sure that the DMX aspects of their lights are fully implemented lest they get left off the Son's fixtures list and miss out on their opportunity to shine.

A thought occurred to me as I played with Son of Hog and did my bit by trying to break the console (the technical term for this is testing). The problem with naming one's offspring before they are born is that there is a 50/50 chance of getting the name wrong. To my mind the only mistake that has been made at this stage is that she is really 'Daughter of Hog' (with a tomboy streak). Her future educational curriculum is currently set to include: Macros, Timecode implementation, internal protocol conversion, rigger's remote, real-time chases that can be embedded in a stack, a black box for play-back only (taking the console away after programming), an optional extra wing, chase creation made easy with some system similar to 'Stack Synth', real-time activity read-out, etc, etc.

On that diet of information the desk should round out and develop nicely. Son of Hog may have been late, but in many aspects it is way ahead. Flying Pig Systems have done it again. Fasten your seatbelts - another Pig is flying, and this one's much prettier.

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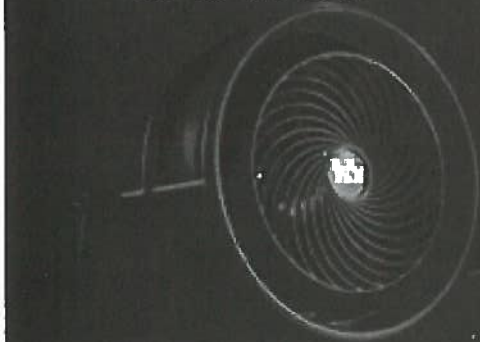
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MARINE LIFE

Ruth Rossington charts the passage of the refurbished QE2

Following the QE2's recent controversial £35m refit, which led to newspaper reports of passengers experiencing cabins with exploding loos, and, in some cases, no cabins to sleep in at all, there have been many reports to find out the reasons for Cunard allowing the ship to leave port before it was ready.

What has not been stated however, is that this sorry PR nightmare eclipsed a highly successful project to design and refit a vessel on a scale never attempted before. Despite the harsh criticism (aimed at the failure to postpone the world cruise and not at the design of the ship itself), many aspects of the project went ahead to plan, were finished on time and, in some cases, cut new ground in their achievements.

The QE2 is the flagship of Cunard and was launched in 1968 as the last of the great liners. It is still the only regular Atlantic crossing by sea left in the world. The original design of some of the public rooms had not been altered during this time and had merely grown tired. Others, particularly those involved in refits after the ship had been used in the Falklands conflict, had been redesigned in isolation and ironically were in most need of being redesigned once again, only this time with a central concept linking the rooms together.

Cunard chose Alex McCuaig of MET Studio to preside over this major refit. In November 1993 he asked Adam Grater and Peter Phillipson of DHA Design Services to carry out a survey of the lighting as it would be a crucial part of his concept to co-ordinate the whole of the new ship's design. Although DHA had not worked on a ship before, they had designed lighting for many large projects where an understanding of both aesthetic and practical issues was paramount.

Phillipson expands: "We decided to review all the public rooms to form an overall strategy of how lighting within any individual area would be designed. Of utmost importance was that the ship's engineers should have input into the type of equipment that would be used, thereby avoiding the problems that occur with lighting at sea. Too often, in previous smaller refits, they had inherited lighting equipment that was difficult to maintain or not really robust enough."

The report was accepted by Cunard and led to DHA's appointment as the lighting designers for the refit. By then the interior design was being prepared by a consortium of MET Studio and McNeece, who are marine architects.

One of the unusual aspects of this refit was the time scale. Within eight months of Cunard appointing the designers, the job had to be complete. This included having to design 27 areas; appointing a shipyard, finding the sub contractors who would install lighting and decoration to each area, and complete all the commissioning. There was an unusual element: an entire portion of the aft of the vessel was to be removed and replaced with a new Yacht Club and Lido complex. This was to be the biggest 'short timescale' project that the shipyard Blohm+Voss were to carry out in all of its 140 year history. Even during the Second World War, when heavy guns were welded to ships, the timescales for this Hamburg-based shipyard were longer.

Much of the ship's original equipment had been made by Philips Lighting back in 1968 and was still functioning. It needed upgrading



Midship lobby: the dominant central column is lit from the floor.



Ambient lighting for the Princess Port Grill.

only because it was at the end of its life. The original lighting plans were hand drawn on wonderful silk drawings, some of which were 12 feet long. There were several types of dimming system installed before the refit, ranging from hand-made 1968 Philips fluorescent dimming which was revolutionary in its day, to motor-driven German dimmers having a 'go' button to start a fade, and a 'stop' button to end it. Very often, these controls were positioned outside the restaurant that they were to control, so the Maitre'D would have to push the button, run in to watch the lights dim and then calculate how much time he had left before running back to stop the fade. The ship did not want state-of-the-art equipment, but established reliable dimmers that had not been updated for two or three years. Strand LD90 racks and Outlook stations were chosen for this reason, with the additional bonus that spares could be obtained in New York and Hong Kong, as well as ports in Germany and England.

DHA Design Services formed a team led by Peter Phillipson, which included Jonathan Howard, Mark Marsden-Smith and Nick Warner. During a trip between New York and Southampton, an in-depth survey of the nuts and bolts of the vessel including measurements of ceiling void depths etc, was compiled together with a whole plethora of data that

would enable them to design meaningful schemes.

Between May and early July 94, the lighting for all of the public rooms had to be designed, and drawings were often biked from the MET Studio to DHA and worked on throughout the night in order to finish the designs in time. McNeece downloaded CAD drawings directly to DHA via a modem, allowing the lighting scheme layer to be added to their plans electronically.

The next few months were to be set aside to enable all of the luminaires to be designed and approved. Instead, the whole scope of the project

was cut back by an amount "just enough to require the entire design process to be redone," Phillipson recalls. "We had been told initially that nearly all of the public rooms were to have new ceilings allowing us to put lighting where we wished. The subsequent restraints in the entire refit budget caused some existing ceilings to be re-used and this led to restrictions in our original intentions.

"This also presented us with a problem: to replace old lighting with similar luminaires, on a one-for-one basis, would hardly have been appropriate as the new interiors did not suit the existing holes in the ceiling. The Fire Authorities do not allow the filling in of previous holes with plaster. Instead, we designed a series of retro fit luminaires that could be set rigidly to aim the light in one direction during the commissioning. Nothing, that may seem commonplace for a land-based project, is straightforward on a ship, even the mains frequency is different at 60Hz."

Eventually, in late November 94, the old rooms were stripped out and the ship entered the dry dock in Hamburg. About a thousand people were involved in the work which took just over three weeks. "It was great to see the plans coming to life at last," said Phillipson. As the job fell into place, DHA spent much time going through last minute changes with the contractors. Mark Marsden-Smith recalls his view of equipment manufacturers: "What I have learnt is that having the right product is only 30% of what a ship's supplier needs. When your contractors are on a £250,000 per day penalty clause, the back-up from companies becomes the single most important issue."

The circular midships lobby is the first interior space that is seen when embarking. There are murals set into the wall edge lit with cold cathode lighting and washed with tungsten light. The central banquette seating also contained lighting in the kick plates and under the handrails, whilst the central 'mushroom' shaped column is lit from the floor.

Oldham Lighting provided about 1000m of cold cathode lighting all over the ship and had to work on a tight schedule to complete the project, which they carried out with cool professionalism. This type of lighting lasts a long time and provides continuous light to coving and featured architecture. In the Lido for example, a large buffet restaurant, cold cathode lighting was used effectively to fill in a central

dark space caused by the high amount of daylight by the aft end windows. "The eye tends to accommodate itself to the bright windows and everything inside can look too dark unless you compete with it internally. By balancing the relative amounts of white and blue light in coving, the daylight didn't appear to drop off so rapidly. Ironically more light is required during the day, in a situation like this, than at night," Phillipson explained.

The promenades and walkways were particularly important as they are the areas occupied by passengers the majority of the time. Before the refit, most passengers spent much time wandering around lost. Now included aboard is a 'Heritage Trail' that co-ordinates all the portions of the ship. For example, there is a large model of the Mauretania, the famous predecessor to the QE2, in a display case with a mural and sky as a backdrop. As the daylight outside changes, the lighting within the display mimics the outside. At night time the portholes light up via a fibre optic harness and the sky changes from near white through various shades of blue to midnight blue.

The Library, a popular facility, has been completely rebuilt, with a luminous ceiling to provide good overall reading light, and vertical lighting to allow the book shelves to be viewed clearly. It is possible to halve the light level evenly without using dimmers.

The Show lounge was fitted with 72 ways of dimming, 12 for the houselights that were left unchanged and 60 ways for the stage lighting. As there was no DMX system installed previously, a new series of DMX outlets have been provided around the stage, and the system is controlled by a Celco Pathfinder console.

The Queen's Room was designed by Michael



A 'Heritage Trail' co-ordinates the ship's many promenade decks.

Inchbald and its striking original ceiling is still in use, providing a unique reminder of its sixties heritage. The main refurbishment was to the bulkheads where a bust of Queen Elizabeth II is lit with blue cold cathode lighting and a key light to contrast with a new curved gold wall.

As Phillipson explains: "Good lighting does not have to be complicated. In the Princes Port Grill, for example, we found during the original survey that although the room had been well upholstered and the cuisine superb, there was something 'missing'. In 1968, there had been a table light secretly hidden in each table column that would cause a glass ornament, mounted on the centre of each table, to glow and illuminate the faces of the diners.

"Once lit, they allowed for the general ambient lighting to be reduced creating an intimate space. The only reason that they had fallen out of use was that extra low voltage (12v)

lighting around at the end of the sixties was a new idea and unreliable. DHA have modernised the method of operation and this simple, but effective, feature, once more adds to this already pleasant room."

The Yacht Club was originally a small Piano Bar. The refit added a lobby and replaced the bar with a larger one, a lounge and club floor. During the day, the club feature is supposed to disappear. Too often disco equipment that is switched off looks unsightly. 10 Clay Paky Miniscans were fitted around the oval club ceiling in line

with the periphery of the dance floor. Their bulk was lost within the ceiling and the moving mirror was just visible through a series of horizontal port holes. They are complemented with fixed coloured downlights all controlled by a Pulsar Masterpiece 108. During the Public Room refit, a technical refit of the engines took place, together with the continuing cabin refit begun in May 94.

It says something about the priorities of the media that when the designers and contractors returned from New York, they were met by an entourage of press at Gatwick Airport, whose only concern was the headline opportunities presented by the 'plumbing' problems. Who can blame them; it's a copywriter's dream. However, despite the less than generous publicity, the QE2 has been sold out since its completion, proving the old truism that 'all publicity is good publicity'.

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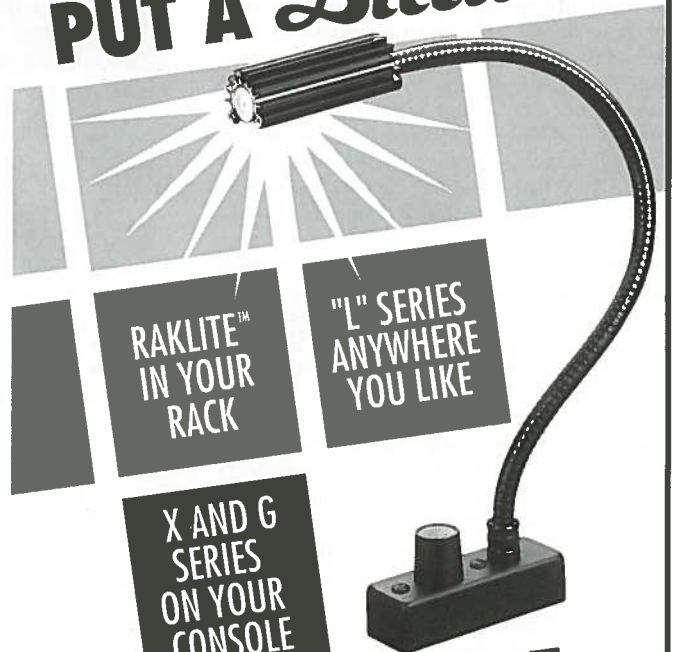
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SECOND TAKE

John Watt's View from Beside the Camera

As I write, it's high summer and nearly everything in this life takes on a more cheerful disposition when bathed in sunshine. Someone near and dear to me has suggested that this column had better follow suit or run the risk of losing its readership who will turn to more cheerful items. So, like the government, I will set out in hopeful anticipation of bringing the 'feel-good factor' back into television lighting.

My current preoccupation is with another game show, but it's so low down the creative scale that even I, desperate though I am for copy, won't reveal its name in these august pages. No, you won't find my guilty secret by watching the credits either, because it's a sponsored job and the roller goes faster than the proverbial dose of salts, in order to make room for 'this programme was brought to you by cheap and cheerful fizzy drinks'. But I have digressed before I have started, a good trick in itself.

As I was saying, it's summer and this show uses a lot of lights (not necessarily well, but it uses a lot), and there are good reasons for this to do with boring things like exposures and depth of field which there is no need to dwell on here. As it says in book one, tungsten lights are a good deal more efficient at producing heat than light so the problem of dealing with this starts to become a worry.

The black art of studio ventilation has always lagged 20 years behind current lighting techniques, but at least in the UK designers get away with it, because it's usually throwing it down in August and a wide enough range of adjustment to studio conditions is usually accomplished by the crew taking their sweaters off if the aforementioned lights start to make life uncomfortable. I was unlucky this year in that a freak heatwave chose to manifest itself in exactly the three weeks that we were shooting five shows a day with the lighting on for 12 hours each day. To add insult to injury, we have a presenter who exhibits a phenomenon previously unknown to medical science, viz - his blood boils at well below room temperature.

The guys who run the air-conditioning plant have done their best - not being creative like us they aren't used to being shouted at by maniacal producers who want them to "do something" to stop their star looking like a canteen sausage at the height of the breakfast rush. They try cutting off the cool air to the unimportant areas (like personnel and training) and extending the cold air intakes from the grid with long elephant trunks to target the star in several key positions. This is remarkably effective on two fronts: it cools the presenter down, but raises the temperature in the offices upstairs to about gas regulo 7, causing the managing director to enquire of his secretary "whether we have a show on today". Unfortunately, even I, breaking the habits of a lifetime, have to sympathise with sound, as with all this air roaring past the mic' it sounds like a November gale on Beachy Head and up with it, they will not put. Clearly, they have no sense of



"There is a Class I Barco monitor nearby to watch the pictures: I guess the dark bit in the middle is the face."

humour, but I thought it gave an added dimension to the show. An uneasy truce exists as each department compromises their position, the star is mopped down and remade up at 10 minute intervals, sound are watching motor racing on the off air and the cameramen are wearing shorts and being philosophical. Conditions in the lighting control room are tolerable as the pictures are OK, we have a kettle and the temperature control (a stage weight behind the door) is sophisticated and works well.

The next job is on location and still the sun shines, damn it. The birds are singing and the bees buzzing almost loudly enough to drown the hum from the HMI chokes as yours truly tries once again to beat God at his own game and reduce the contrast ratio between face and sky. I know normal people take their family to the beach, or go to Wimbledon and Henley at this time of year, but we lighting designers are happiest loading extra lamps and wondering why we failed to persuade the director that to put his camera at the back of a double-fronted shop looking south wasn't a good idea.

No I cannot ND (filter) the glass because there is action through the door. No I cannot park a big black furniture van outside, because the action involves the road as well. No we cannot use a grad' filter as this will put the face at the top of the frame as the shot develops, and no I can't put any more light in the shop; there are already three and it's not that the generator is limiting us, or that I haven't ordered enough, but merely that we have to hide the reflection from each with a poster on the window and there is a limit to how many the art director will put up with. Solutions to all this should be sent on a postcard marked at the top left corner 'top left'. All contributions from Wood Norton will be ignored.

Never mind, it's summer, and the gaffer buys me a big whopper from the ice cream shop next door and has put a flight case marked Blondes in the shade for me to sit on (I wondered why I ordered them). There is a

Class I Barco monitor nearby to watch the pictures: I guess the dark bit in the middle is the face. Have you tried monitoring pictures in broad daylight even under an old blanket? It lacks precision and probably explains why film lighting cameramen are paid so much, i.e. they know what the picture is going to look like without cissy things like monitors.

Happily, video lighting men are learning these techniques and post-production equipment is now available which mimics the pots of boiling developer available to our film colleagues, and now allows us to distort the colours, remove the edge and over and under expose the picture without any need to get it right in the first place - but it's summer.

A consequence of the heatwave is that not many people are watching television anyway, and those that are, are watching it in broad daylight. This improves the 'feel-good factor' enormously, as you can rest assured that they won't know whether the pictures are good, bad or indifferent. About the only essential viewing is the news, so that you can feel informed about world affairs without buying a newspaper. Photographers can be assured of hours of fun either counting the key lights or trying to spot one. This has nothing to do with summer, as the lights were screwed in position by an engineer in 1987 and haven't moved since (the cameras and presenters have, but not the lights).

I do hope, like me, you are having a fun summer.



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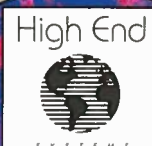
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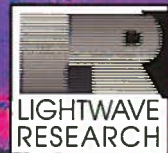
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COURT ON CAMERA

Ruth Rossington at Wimbledon with the BBC

The mere mention of the word Wimbledon evokes strange emotions in people, who, awash with sentimentality, remark on its quintessential Englishness, its sense of tradition, strawberries and Pimms on the terraces - in short, for many people, Wimbledon represents all that is good and fine about the British. It's no surprise then that demand for Centre Court tickets has, for decades, far exceeded supply, and so for the past 60 years, names have gone into a hat in a typical demonstration of the British sense of 'fair play'.

For the small band who get the privilege of rubbing shoulders with royalty, there can be few more memorable occasions, but for the masses, forced to slum it in their own front rooms, there is consolation to be had in the form of the BBC, whose consummate coverage of the event is a major feat of technical and logistical planning. In fact, it could be argued that they have the better part of the deal, for perched high on the south terrace of Centre Court, watching Martinez and Sanchez Vicario battle it out for a place in the final, I missed the soothing commentary of Bill Threlfall and Ann Haydon-Jones and, worse still, found myself wondering whether a rather poor forehand volley had been Conchita's fifth net shot or her sixth.

Now well past its centenary, Wimbledon has been staged no less than 109 times. The cameras have been there to record a good part of this history, but with a statistic-hungry public baying for facts, facts and more facts, the role of the BBC has become one of mass media provider, so that its net has not only to cast wide for every possible angle on the exchanges between the players, it also has to ensure a steady stream of vital trivia, carefully orchestrated onto the screen into a seamless presentation that is, by and large, taken for granted by the couch potatoes of this world - myself included.

The picture on our screens has nothing to do with luck or judgement - it's all down to military-style planning and the ability of the BBC technicians, in the most trying conditions, to keep their heads when all about them seem to be losing theirs. The BBC encampment is the first clue: tucked away behind the familiar facade of the ivy-clad buildings sits a small village of OB trucks. Three weeks earlier this area had been a deserted car park, but in a short time, considerably more equipment than most TV stations install permanently, was rigged for just a two-week stint. The sheer



The main CMCCR, with vision mixers in the foreground and the executive producer far right.

logistics of the operation defy description, but under the gentle guidance of Ian Dow, an engineering manager of OB resources, whose calmness under pressure is almost sickening, the might of the BBC was laid bare.

The flagship vehicle in the fleet, the Central Mobile Colour Control Room (CMCCR) is the lynchpin of the operation and houses the first echelon of the 160-strong technical crew that populate the site. Though America can compete with it on size, it cannot compete on complexity, and this is, without question, the most sophisticated OB vehicle in the world. At a cost of just over £2m, the technology doesn't come cheap. Its role at Wimbledon, as with the many other events it covers throughout the year, is to act as the main production hub, where instant access to a staggeringly large number of sources fed from a number of other OB units is required. Aboard this metropolis of technology sits the deputy head of sport for the BBC, John Rowlinson, the director with overall responsibility for Wimbledon coverage, Martin Hopkins, and a small team of vision mixers, sound mixers, vision control engineers and production assistants.

At the vision control end, space is very tight, and it was a revelation to me, squeezed in

behind Jim Daniels, the vision supervisor, that there are people dedicated to monitoring the camera exposure, continually compensating for the lack or excess of light and restoring the colour balance to the picture. And you thought the grass was green at Wimbledon?

It's also from here that the hoist camera is controlled. This is the camera with a 70:1 zoom that sits on top of a 200ft hydraulic hoist overlooking the entire Wimbledon complex, and is much called on by TV presenter Desmond Lynam and Martin Hopkins as they trawl the outside courts updating the viewer on the various states-of-play around the site. It is also here that talk of 'nanosecond delays' drift into the conversation - a cue to move on.

Not surprisingly, space is at a premium throughout the CMCCR, an issue addressed by the articulation of the unit, whose dual expanding sides extend in two stages to give one of the largest production areas available in Europe. Fully extended and measuring 15.6m x 5.8m, the unit encompasses the main production area, plus additional space for two multi-role desks. The monitor stack, with 64 colour monitors, is built along the length of the vehicle, creating a multi-screen panorama for the production staff.



Co-ordinating sound supervisor Doug Whittaker at the CMCCR desk.



Desmond Lynam prepares for a link in the main studio.

Doug Whittaker, the sound supervisor responsible for co-ordinating the sound for the event, has at his disposal a 140-channel stereo desk, the biggest mobile desk in Europe at the time of its installation. An AMS/Calrec hybrid, it is comparable with many studio desks in a more compact frame, but is primarily designed for live TV mixing. Many facilities on a recording version are pre-set by computer, whereas this console has a great many controls with instant access to allow a fast response to change.

Good communications are vital on an operation of this scale, and the same area provides the telephone/talkback and intercommunications facilities to all the technical areas - the equivalent of a telephone exchange for a small village. To achieve this, a decidedly rudimentary, but nevertheless effective, pin matrix system, with 100 inputs and 150 outputs, is employed. Its advantage over its computer equivalent, is that it is much quicker to set up, and, in addition to routing a particular source to any number of destinations, can also route more than one source to the same destination.

As host broadcaster, the BBC is charged with covering matches from all six show courts, and feeding the six signals to all international broadcasters. This ties up a further three outside broadcast units, one of which sits just yards away from the CMCCR and operates up to 10 cameras and five slo-mo replays to cover the action on Centre Court. A team of vision engineers rack and colour balance the cameras, the sound supervisor mixes the court effects and crowd effects, with the umpire and commentary microphones, whilst each slo-mo machine has a dedicated operator.

As we enter the director is concentrating on the latest power struggle on Centre Court. We listen in as he coaxes camera 6 to get a close-up on Graf for the inevitable look of angst as yet another backhand skims wide of the line. There then follows some manic punching of buttons, a quick check on monitors 3 and 4, hasty instructions to the slo-mo lads, and a few words with the commentary box before he prepares for the next volley of shots from the Graf racquet. In the attempt to keep up my wits rapidly desert me, and exhausted with the effort of it all, I slink out quietly, grateful that I have a 30-day deadline and not a 30-second one.

Within the sound control area are two main sections; programme sound and the talk-back intercom network. The heart of the audio system is a stereo 44-channel Calrec Q Series sound desk - a powerful system which offers great flexibility in a TV broadcast vehicle. For example, from the eight stereo groups, six stereo main outputs are available, together with associated mono feeds, and there are eight auxiliary sends, two of which are stereo. Also fitted is a Yamaha SPX1000 reverb and effects unit, a Lyrec 1/4" recorder with timecode and a Tascam audio cassette machine.

Several effects mics are positioned around the Centre Court. A single stereo mic takes a central position at the main camera end of the court and feeds a 'middle' and 'side' signal to the mixing desk, enabling both a mono and stereo output to be derived and fed to other broadcasters. Sennheiser 416s cover the main playing areas, the crowd and the umpire's chair with a further mic aimed straight across the net. Augmenting these is a general effects mic tucked high above the south terrace.

On scaffolding above the OB colony is a small studio where Desmond Lynam performs his links to camera. In this small space a



Ian Dow, overlooks the area where the new courts and TV centre are to be built.

multitude of problems manifest themselves which have to be solved by Peter Osborne. Lynam sits with his back to a picture window overlooking courts 14-17. TV cameras can, at best, handle a contrast ratio of 40:1, compared to the 1000:1 of the human eye. In daytime, it is too dark inside the studio and much too bright

In order to mount six simultaneous tennis OBs, run two studios, feed BBC 1 and BBC 2, record and edit a one hour compilation each evening, the BBC used 34 cameras, 39 videotape machines, over 150 microphones and rigged and de-rigged 37 miles of cable.

outside. Sheets of 0.6 neutral density perspex are fitted to the windows to reduce the imbalance, whilst inside HMI and MSR discharge lamps are used to match the daylight colour temperature and produce enough power without too much heat to light Lynam and his guest. A 575W MSR is used as the key, and the dimmable ballast and the use of spot and flood allow enough control to match conditions outside should the sky cloud over. 200W MSRs slung above the window provide backlight to give a 3D effect to what is a 2D medium. 1.2kW HMI DeSisti floods provide fill light from above the camera and 'lift' the inside of the scenic window frames. All the lights have to be carefully positioned and controlled so that they are not a distraction to the players on the adjacent court.

Come the evening 'highlights' programme and the problem is reversed. It's too dark outside and too bright inside. Off comes the neutral density perspex on the window and outside a brace of Arri 2.5k HMI Pars are blasted onto the facade of the Debenture Holder's lounge in the back of shot. Inside the studio a tungsten rig takes over, with Arri 1k fresnels as keylights and Arri 650W as backlights and scenery lights. Gels and gobos are used to produce some relief on the side walls of the studio and the rig is controlled by a Jands ESP 24-channel desk.

With darkness outside the picture window has now turned into a very efficient mirror. This is deftly circumnavigated by raising the lamps carefully, applying black wrap to any escaping shafts of light and rigging black felt as a gobo hanging from the roof. Finally, an ivy leaf is pulled from the designer's plant arrangements and carefully blu-tacked to the window to blot out the annoying strobe light from the top of Canary Wharf 10 miles away.

In a second small studio, where Sue Barker interviews the players, the lack of space is even more pronounced. Here, a Soundcraft Series

200 desk runs a lot more than the microphones and has the communications hooked up to a number of scanners serving 31 broadcasters. A Strand LX, working with Tempus dimmers, controls 650 keylights plus softfills and 1.2kW fills with 300s on backlights. The board is set up so that it is quick to change the lighting state if there are two interviewees or if the interviewer wishes to be in shot. The lighting equipment is from AFM Lighting, with a mixed crew of three electricians from AFM and BBC, who between them run the two studios and keep a watchful eye on the 400kva distribution system feeding the OB vehicles.

As we tour the complex, we duck in and out of several OB vans, understairs rooms and portacabins, where small pockets of technicians are hard at work either recording, editing, sound-checking or mixing graphics. Despite working 'live', most seem quite at ease with the fact that they are responsible for supplying something like 466 hours of tennis coverage to broadcasters worldwide. There's something extraordinary about the way it all comes together: just one weak link in the chain, either technical or human, could bring the whole structure crashing down. And it doesn't end with the UK.

In addition to what we see on BBC 1 and BBC 2, the corporation is also the host broadcaster, and as such, it falls upon them to provide footage to other broadcasters. Although the final figures are not yet available for this year's Championships, the scale will certainly match last year's, where it was estimated that signals from Wimbledon were transmitted to a potential 600 million homes throughout the world. At this year's event, 15 other British and foreign television companies, all using BBC feeds of the six courts, used their own programme production facilities in the Club grounds to build on what the BBC provided, in order to commentate on matches in their own style and to conduct their own interviews with the players.

I can't close this chapter on Wimbledon 1995 without relating one story as told to me between sets on Centre Court. Several years ago, a Japanese TV company used one of the BBC scanners to transmit an introduction to the day's programme from their own presenter standing on court. It seems a Japanese director, wanting a shot of the spectators, demanded a shot of the 'clouds'. A bemused cameraman duly delivered white fluffy clouds and pale blue skies. "No, no I want clouds." More cameras offered similar shots in a vain attempt to please the director. The engineering manager, sitting alongside, and realising the misunderstanding, leant across to the director's mic and said "he wants crumpet". Immediately, eminently suitable shots of young lady spectators were offered. Believing this to be a television technical term, the Japanese director spent the next two weeks asking for the 'clumpet' shot! No doubt, there are many similar apocryphal stories to be heard along the corridors at Television Centre. Whatever the problem, it is very rare that the viewer actually notices: the technical crew may be paddling like hell underneath, but on the surface, all is serene.

When the BBC come to assemble their massive OB operation at Wimbledon next year, it will be the last time they pitch camp on Car Park 4. In 1997, phase one of Wimbledon's 20-year master plan will see the BBC and international broadcasters in the new TV Centre built by the Club, by which time the campus of BBC OB units will have decamped and regrouped no less than 100 times. Remember that next time you switch on your TV.

ASLEEP IN THE STALLS

Now that I know the Quadriennale winners in Prague I can say 'well done' to the British team, who carried off a gold medal and would probably have taken the Triga if Britain's name weren't still freshly engraved on it from last time around. I can also express great satisfaction at Brazil's success, and a tinge of surprise that four very ordinary German theatre designers on a very high quality exhibition stand should have hoodwinked the international jury into giving them a gold medal for set (not stand) design. Even the stand, I still reckon, was better done by the Dutch students in the other hall.

Never mind, it's time to look at what's been going on a little nearer to home, and pick out one or two shows of technical interest to L+SI's keener readers. Fortunately, there's no shortage. The West End has welcomed a couple of fine out-of-town productions of straight plays and a Stockholm/Plymouth musical; the Royal Court has what I'm going to be going on about in *Theatre Record* as a 'seminal play of the nineties' (honest), and the National, at last, has a show where stunning production values for once enhance what's going on in the play, rather than distract from it.

Ronald Harwood's *Taking Sides* has come in from Chichester's three-sided Minerva to the Criterion and survives the translation pretty well. Director Harold Pinter's long-time designer Eileen Diss has given him a slightly two-dimensional set which probably came off better in the Minerva, though the three-dimensional performances of Michael Pennington and Daniel Massey offset this pretty well in the Criterion. They also overcome the complaint of one Chichester critic that some of their important confrontations there weren't visible to half the audience. Mick Hughes' lighting is invisible, therefore excellent.

If Nick Beadle's lighting in Pinter's own play *Old Times* (which has come to Wyndham's from Theatre Clwyd) is more obvious, it's no less effective. There's a wonderful seashore effect on the cyc, with surf gently rolling almost throughout the play and visible through the doors and windows of the two rooms of Julian McGowan's beautifully brooding set. Atmosphere is vastly important in Pinter, and the contribution of Messrs Beadle and McGowan, although it has received rather less attention than Julie Christie's come-back performance, is just as much responsible for the production's success.

Fame at the Cambridge was tried out in Plymouth, but developed two years earlier in Stockholm and it is the Swedish director/design team who bear responsibility for its look. The show has two great visual coups: an opening number which cleverly mixes film footage of New York with introductory glimpses of the cast through the gauze on which it is projected; and the final introduction, after the first curtain calls, of that yellow cab to recreate the scene we all remember from the movie, where the kids dance all over it. It sends audiences out on a useful high and helps erase memories of the rather pedestrian nature of the stage show itself. Svein Lund-Roland's set, albeit as dull as the corridors of the High School for the Performing Arts doubtless were, has all the right equipment for a big musical - plenty of flying, bridges that swing in and out, even side-trucks that revolve to give us an exterior scene, its colour scheme as

dull as the school's interiors. The trouble is that Runar Borge, the director, and his choreographer Lars Bethke, don't seem to have much idea what to do with such an admirable set of available spaces. The bridges appear and disappear pretty aimlessly, and the exterior is used once only, near the end of Act 2, when the audience has almost given up hope of getting out of the school setting. Terry Jardine's sound seemed incredibly loud, but undistorted, which probably means it's about right for the pre-teen audience that is going to be screaming its way through the show for some time to come.

Over at the National, Richard Eyre's production of Eduardo de Filippo's *La Grande Magia* gets wonderful support from the Marks - Thompson and Henderson. It's a play about illusion and reality and the opening emphasises this by having a real old-fashioned drop-curtain (a painted one, which looked remarkably like the one at Stratford East I'd seen a night or two before) and shell footlights in front of a brass-railed orchestra pit, in which a conductor arrives to start proceedings with his baton. There's no band in the pit, but instead it gives Thompson a chance to pull off a splendid moment: the hero's wife, having been made to disappear as part of a Bernard Cribbins magic act, runs off to Venice with her lover, and, at the appropriate moment, a splendid speedboat rises up out of the pit, with the runaways at the helm - great stuff. Tremendous atmosphere from the Henderson lighting too, which offers us an outdoor dusk in a seaside hotel garden before taking us indoors for the play's descent into the obsessive and developing madness of the abandoned husband, the magnificent Alan Howard. My one complaint is that the side-floods at floor level behind the pros, which create a lovely moonlight-on-the-water feeling in Act 1, do so at the expense of shining into the eyes of the front half-dozen rows of the Lyttelton.



Bernard Cribbins in *La Grande Magia*.

photo: John Haynes

At the Royal Court there's a lot of light-in-the-eye work, too, but this is more intentional, since Jez Butterworth's *Mojo* is an 'in-er-face' kind of play. It's not so long ago I was enthusing about Ultz's dilapidated set and Alan Burrett's skip-salvaged lighting for *Slavs* at Hampstead.

Here, with rather more budget, Ultz has constructed a seedy club on two levels (one seen in each half of the play) and what looks pretty simple has actually involved a lot of building on the Court's stage, with false ceilings, a spiral staircase that would be the envy of Stephen Brimson Lewis if it were painted pink, and plain walls mitred in over the Court's usual door and window pro arch. The decor carries right out into the circle, and the lighting (with Ultz himself claiming responsibility this time in collaboration with Mark Ridler) is also quite a design feature. Not just the bank of floods that shines on us from upstage left as it picks out the rock star whose kidnapping is the theme of *Mojo*, but the practical mirrorball suspended from the centre of the Court's ceiling. There's a touch of *Slavs* again in the use of neon tubing, but the big conventional rig makes use of some pretty strong gels, banks of reds and blues and a rack of sickly greens slung stage right for a rather grisly morning-after scene in Act 2. *Mojo* is a highly accomplished show by a young author of incredible promise, even if he is the most foul-mouthed writer since David 'f***ing' Mamet, and it's great that the Royal Court has not only put it on the main stage, but given it a staging that's something equally special.

Ian Herbert

Ian Herbert is the editor and publisher of the critical journal, *Theatre Record*.



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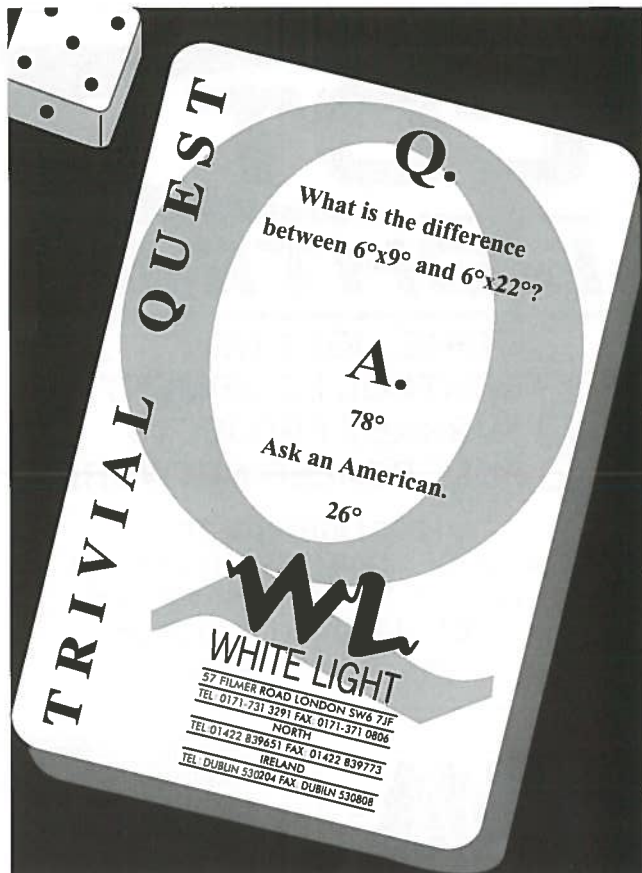


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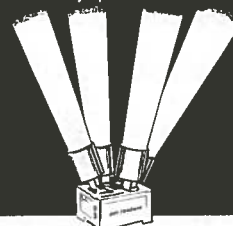
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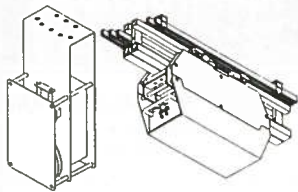
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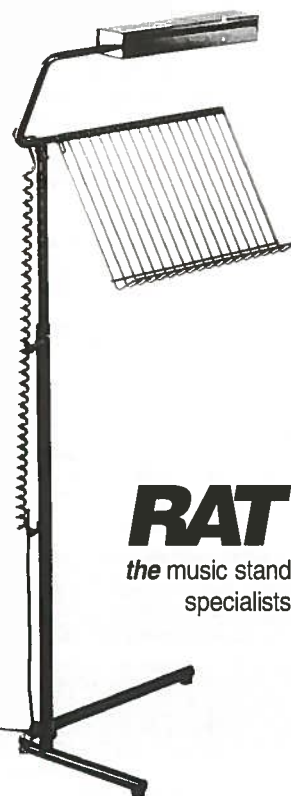
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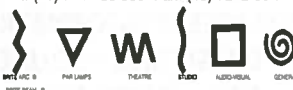
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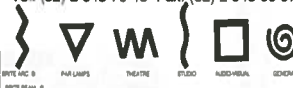
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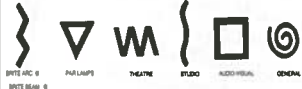
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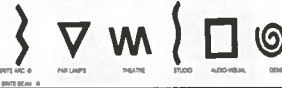


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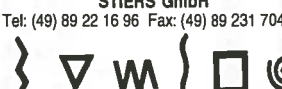
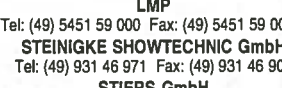
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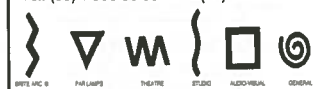
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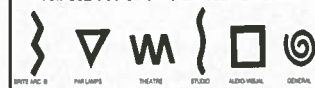
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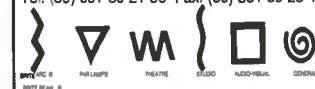
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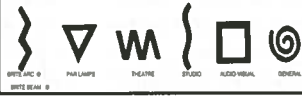
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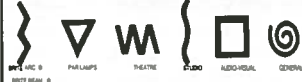
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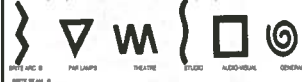


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VIEWPOINT

Graham Walne on being Technically Correct

A colleague of mine has frequently remarked that we should take some confidence in our backstage skill because we have been exercising it for around 400 years. Certainly, an Elizabethan flyman would recognise many elements on a modern flyfloor: his stage counterpart would still recognise a flat among all today's steel and even an Elizabethan snuffer wouldn't take long to adjust to a spotlight, since the most sophisticated sixteenth century candles were equipped with reflectors, lenses and (silk) colour filters.

With this heritage of experience why is it that many new theatres still have fundamental technical problems? Whenever technicians gather, the hot subject is always the latest horror story from the latest new theatre. Incredulity is the order of the day; 'that wouldn't have happened', we say, 'if only they had consulted the people who work in the theatres'. It is episodes such as these which devalued the word 'consultant' in the seventies, and today's expert is more likely to be concerned with business plans than ground plans. There is evidence, however, that much has been learned over the last two decades, and consultants do need time to develop such a perspective. Theatre consultancy can't be a young art; I don't know of anyone who left drama school and called themselves a consultant (except myself - incredible arrogance!).

Maybe perfection is impossible, despite our 400 year heritage. Many years ago, I was fortunate to be the guest lighting designer at the Royal Academy of Music for 90 operas. After 20 or 30 productions, I was asked to be the consultant to the Academy's new theatre and I thus wrote the brief for myself. As I worked in the new theatre, I agonised on how anyone could get it right when, the specification I had written for myself still contained some glaring omissions.

Of course, styles and policies bring their own pressures. At the Royal Academy of Music the house policy was to forbid any lights to be visible in the auditorium and this, coupled with the operatic lighting of both myself and the directors of the day, meant that there were few FOH positions. Years later, as drama directors moved into opera with their own lighting designers, massive FOH trusses and multicores appeared with the aim of seeing more faces. As a consultant, I do admit to looking at prospective lighting positions from the confines of my own style, but I am fortunate in having lit a variety of productions. As people change during a project, so their different styles can bring different pressures.

Of course, architects have a reputation for constricting technical input in case it interferes with their style. However, the truth is sometimes different. When I was the consultant for the Hawth at Crawley, architects Norman and Dawbarn worked very hard to encompass all my requirements and did so without any damage to

their building (at least in my eyes!). Nevertheless, technical manager Chris Wilcox inherited his fair share of headaches. Consultants do need to be vigilant because architects will innocently sneak things past them; for example, by delaying the issue of vital drawings to prevent interference. Many clients and users are also kept at arms' length by claims that detailed requirements can always be included after planning permission has been granted, but these are often constricted by the costings and infrastructure surrounding the initial planning process itself.

Another problem is the difficulty of finding consistently reliable suppliers. One 'dodgy' installation and a consultant can't ever take the chance again, however logical the reason for the problems. In these circumstances, a wise supplier instigates a rapid and effective complaints

"It astonishes me how many times people forget how small the industry is . . . sadly, the troops who have to live with the consequences of others' mistakes are rarely consulted early enough, so words cannot become deeds."

procedure with the sole aim of ensuring user satisfaction rather than justification to the consultant - in the end it is the show that matters. It astonishes me how many times people forget how small the industry is, and how much people move around and talk. Sadly, of course, the troops who have to live with the consequences of others' mistakes are rarely consulted early enough, so words cannot become deeds.

Consultants also have crosses to bear in their clients. Some years ago I was honoured to assist John Wyckham in his partnership's work at the Manchester Palace. John battled long and hard for a good technical budget against the client's belief that most of the equipment from the old Palace would be good enough, and Mr Wyckham's ears frequently resounded with the epithet, "we're not putting Superstar on here you know!" Readers have one guess which show opened the theatre! Fortunately, the touring policies of the national companies changed and came to Mr Wyckham's aid in time for the backstage area and facilities to be upgraded, but it was close.

Since consultants are individuals, their projects reflect their idiosyncrasies and, since most of today's technical consultants have come through the lighting route, their projects are strong in this area. Larger practices can bring broader experience to bear and this is also true of the Theatre Planning Committee of the Association of British Theatre Technicians (ABTT) which has a long and distinguished history of providing advice. However, committees are not ideal for continual detailed scrutiny, and it is frequently the detail

which goes awry. Perhaps part of the problem is that our heritage is not being passed on effectively; in architectural terms Roderick Ham's *Theatre Planning*, produced in association with the ABTT, should be required reading. I suspect, however, that many people who are responsible for planning theatres have never seen it.

The ABTT was founded to disseminate information and there is criticism in some quarters that the need is outstripping its supply. The ABTT is producing some excellent codes of practice and perhaps should reinvoke its technical committees to produce similar works on the nuts and bolts. Years ago the Arts Council's excellent 'Housing the Arts' funding programme for buildings required applicants to consult the ABTT, and although the scrutiny of applicants to the Arts Lottery is thorough on many strategic and administrative matters, it is perhaps less so on the kind of technical detail which concerns theatre workers.

Are we more conscious now of technical matters than we were? Have we conveniently forgotten the technical problems of our youth? Do today's productions place greater stresses on the facilities than those of past generations? Are the physical loads imposed by today's

scenery and the electrical loads imposed by today's lighting and sound rigs far greater than anything past technicians could have envisaged? I doubt it - our predecessors coped nightly with 16 polar bears in a tank at the London Hippodrome, horse races round the Coliseum revolve and train crashes and shipwrecks at Drury Lane. However, as with many aspects of our life, in years past the paucity of technical publications would have limited analysis and reporting of any related difficulties. In Victorian days, *The Times* newspaper was a reliable source of information, but, only in the right social circles - technical developments in districts where *The Times* was not read were not reported and much was missed.

This article was to include a litany of experiences, but the libel laws put paid to that, and so the saloon bar circuit will have to suffice. Even today, the problems which face technicians in theatres need better reporting and better responses - we must have learned something in 400 years!

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