

# HARRISON & HARRISON

## ORGAN BUILDERS



### Past, Present and Future

Nameplates are not everything, but Harrison & Harrison is a name to conjure with. A Harrison nameplate (attached to an organ) always betokens an instrument of great musicality, reliability and quality.

Thomas Harrison served his apprenticeship with Henry Willis, one of the finest organ builders of the Victorian age, and founded his firm in 1861 at the age of 21. He settled in Durham in 1872, and the firm rose to great distinction under the leadership of his sons Arthur and Harry. The organ in Durham Cathedral was the springboard for the creation of many superb organs throughout the 20th century in cathedrals, concert halls, city churches, country villages and private houses.

H&H employs over 50 people, and the workshop is busy with many projects. Organs are the mainstay of the music within the Anglican communion, and we build and restore organs in countries such as Australia, the United States, Nigeria, South Korea, Japan, and Sweden. In church, concert hall or cathedral, a Harrison nameplate will continue to be the valued hallmark of a good organ, whether old or new.



H&H Staff 1940



H&H Staff 2016



Thomas Harrison  
fl. 1861-1895



Arthur Harrison  
fl. 1893-1936



Harry Harrison  
fl. 1897-1945



Cuthbert Harrison  
fl. 1945-1975



Mark Venning  
fl. 1972-2011



Andrew Reid  
fl. 2017 -



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### Organ Building

Organ building has been described as “engineering in wood”, requiring skill and artistry in equal measure. The organ is not only a mechanical marvel, but is first and foremost a musical instrument, and each organ is unique in sound, layout and size, depending on the acoustic, the position in the building, and what it will be used for. The specification is planned by the voicer; his vision is then translated into a workable and affordable design, with casework to match the building.

Organ builders are skilled craftsmen, working with wood, leather, metal, glue and low-voltage electrics. Larger organs have electronic interface at the console to assist the organist in selecting stops to create different colours of sound for the liturgy or for the concert repertoire. Components are made in the workshop, using hand-tools and wood-working machines, and each organ is assembled to ensure that it is working perfectly before being dismantled and transported to its destination. To complete the installation, voicers make the organ ‘speak’ in harmony with the acoustic of the building.



Craig working on the keys



Adriel working on a foot plate



Geoff working on Canterbury Bourdon chest



Nigel fitting loops



Leathering high pressure feeder

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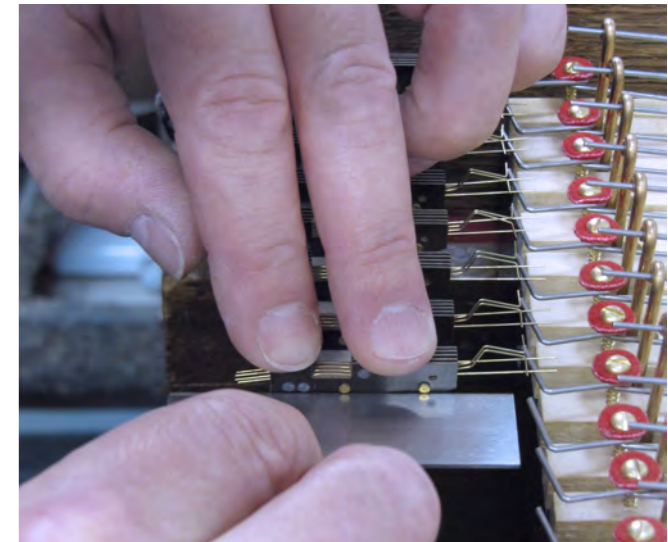


### Pipe Organs

Pipe organs are “fearfully and wonderfully made”. The sound is created by wind at a chosen pressure which has travelled from the bellows (or reservoir) to the pipe.

The keyboard operates the mechanism with either (1) tracker action (mechanically), or (2) pneumatic action (puffs of wind operated by miniature bellows or ‘motors’), or (3) electro-pneumatic action (‘motors’ assisted by magnets and solenoids). The drawstops (the knobs beside the keyboards) operate sliders in the soundboard allowing wind to enter the selected rank of pipes.

Before 1539 there were five small organs in Durham Cathedral, and the organ "ouer the quire dore" was one of the finest in England. Organs have been popular in parish churches since early Victorian times. An organ in a village church might have fewer than 1000 pipes, but the Harrison & Harrison organ in Durham Cathedral has 5734 pipes.



key contacts



Barker Lever action



tracker action



Colin working on the electro-pneumatic action



pneumatic action

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### Metalwork

All organ pipes are hand-made, and it takes a lot of strength to make the big ones.

Pipes can be short and fat, long and thin, square (if made of wood) or cone-shaped, and range in length from 5mm (sounding like a dog whistle) to 32ft (sounding like the song of a whale). The pitch of each stop is measured by the length of its longest pipe: 32ft, 16ft, 8ft, 4ft, 2ft and 1ft. 'Mixtures' have several small pipes for each note.

Pipe metal is cast in varying thicknesses (tiny pipes need thin metal), and can be plain (30/70 tin/lead) or spotted (50/50). The spots appear naturally as the metal cools.

The pedal 'organ' (organists play with their feet) needs 30 pipes for every stop. (Durham Cathedral has 25 pedal stops.) Manuals need at least 58 pipes for every stop. There are hundreds of pipes in every organ, most of them hidden from view. The loudest and longest pipe in Durham Cathedral is bottom C of the 32ft Double Ophicleide.



Rolling Zinc sheets to form pipes



Finished pipes



Furnace



Casting Pot



Metal cut to shape ready to be formed

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### Woodwork

Wood is a basic ingredient of the pipe organ, and organ builders are highly skilled woodworkers. Beautiful woods are used for the console and casework, and woods with high tensile strength and stability for the structure and working parts.

There is a choice of oak, ash or walnut for the casework, and a hard wood such as iroko for the pedals. Keyboards are usually bone or 'alternative ivory' with ebony sharps, but we occasionally reverse the colours using ebony and lemonwood. Rosewood is used for drawstops. Wooden pipes (which range in length from 32ft to one inch) are made of yellow pine or poplar.

Central heating in churches (a new invention!) has challenged the old technology, and modern composites such as marine-ply, which do not twist or shrink, are now used alongside natural timber for soundboards. Trackers (which need to be long and lightweight) are of western red cedar.



casework



Bench



Sanding actions



Rob drilling



Melvin making framework

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### Tuning & Maintenance

Organs, like any other complicated machine, benefit from regular maintenance. Cathedral organs are usually tuned once a month, whereas smaller organs in country parishes might need only a single visit each year.

Harrison & Harrison have a team of tuners, all fully qualified as organ builders, who tune and maintain instruments from Exeter to Inverness.

Organ pipes are subject to the laws of physics, and the tuning varies according to the temperature. This can change significantly from summer to winter, with reed pipes needing more frequent tuning than flue pipes.

Organs can malfunction if dirt gets into the mechanism or the leather cracks, and tuners are very skilled at making sure that the organ remains in good working order.



Trainee Tuners Charlotte & Ainé



Laura cleaning a reed tongue



Ian listening to the organ after tuning



Stephen tuning



Rafael



Jake tuning

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### Voicing

Voicing is a skill unique to organ building, combining advanced hand skills with the ability to create and analyse sounds from wood or metal pipes. New pipes are made to the proportions calculated by the voicer to create the sound required.

There are two kinds of pipe: flue pipes, which have a mouth and languid, or reeds with a brass tongue and shallot.

Many pipes have the names of orchestral instruments, such as flute, cor anglais, clarinet or trombone, and the voicer persuades the pipe to speak the correct sound in the workshop.

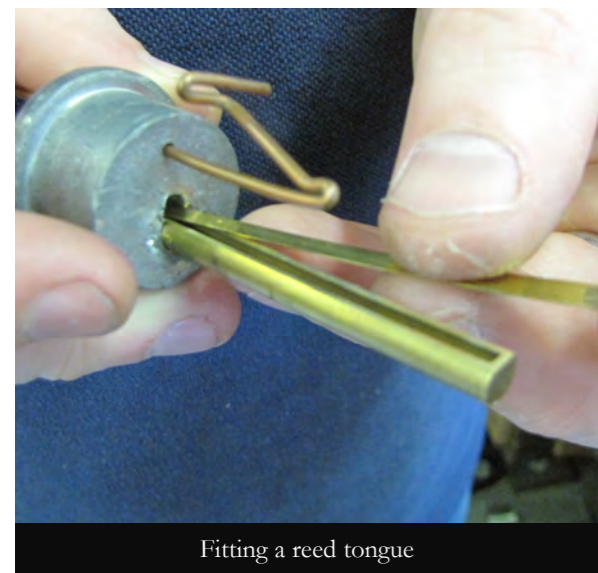
Once the organ has been assembled on site, the pipes are regulated to the acoustic of the building to perfect a musical instrument.



Andrew Scott, Head Voicer



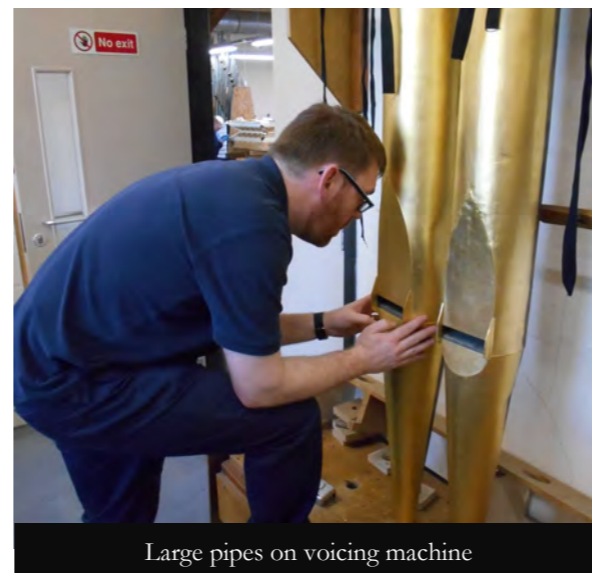
Andrew Fiddes, trainee Voicer



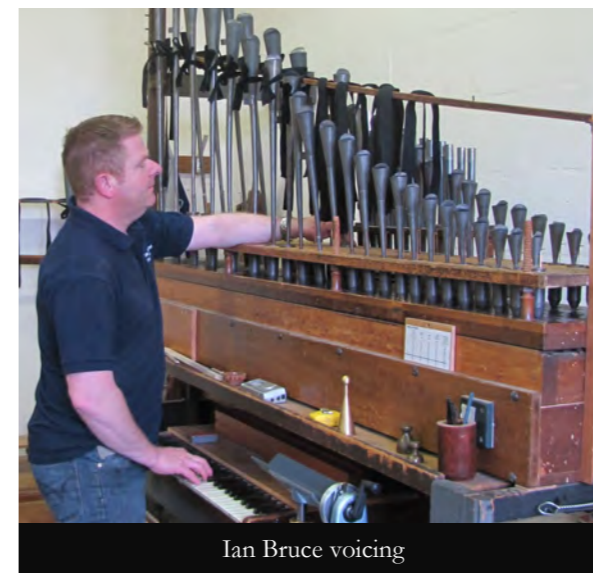
Fitting a reed tongue



Voicing



Large pipes on voicing machine



Ian Bruce voicing

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### Training and Apprenticeships

H&H is committed to training. We take trainees at any age; some come straight from school or university, and others have advanced woodworking skills. Initial training may take up to four years, and skills continue to develop thereafter. One of the first jobs is to perfect the skill of leathering motors which are miniature bellows for the organ mechanism. Woodworking skills are developed to a high standard, as accuracy is vital. All aspects of organ building must be mastered, and trainees go on to develop specialist skills which may include console work, leathering of reservoirs, pipemaking, tuning and voicing.

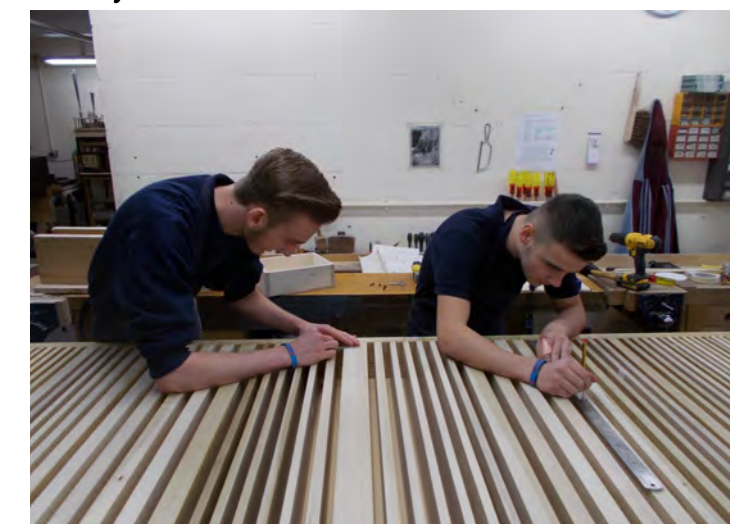
Organ builders work as part of a team in the workshop, and also in churches and concert halls, both nationally and internationally. When choosing apprentices, we look for people who will thrive in a skilled and friendly environment; the work requires an eye for quality, attention to detail, versatility for a wide variety of tasks, and willingness to work away from home.



James cutting leather for actions



Training



Working on a soundboard grid



Working on contacts



Duncan training Andrew

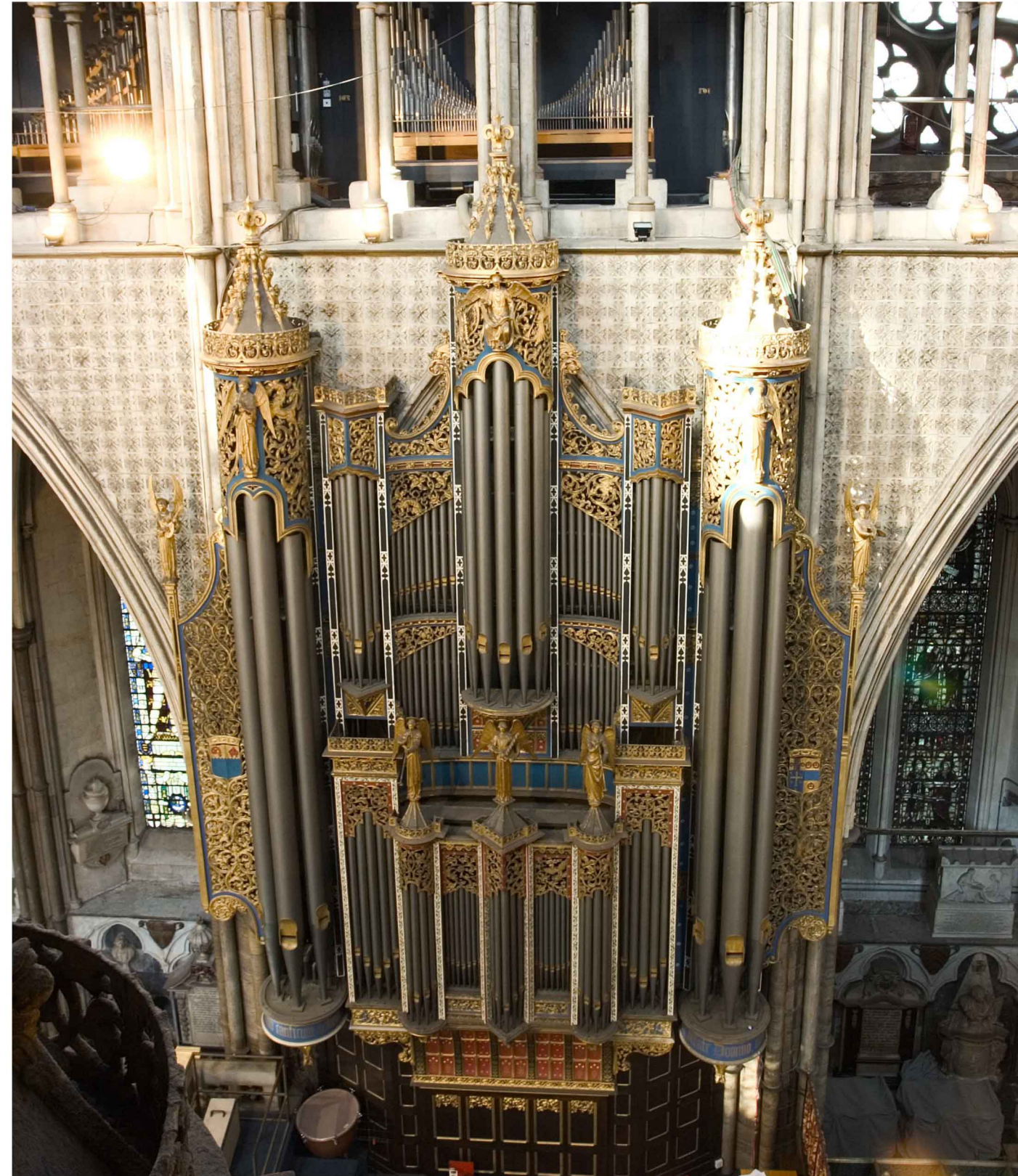
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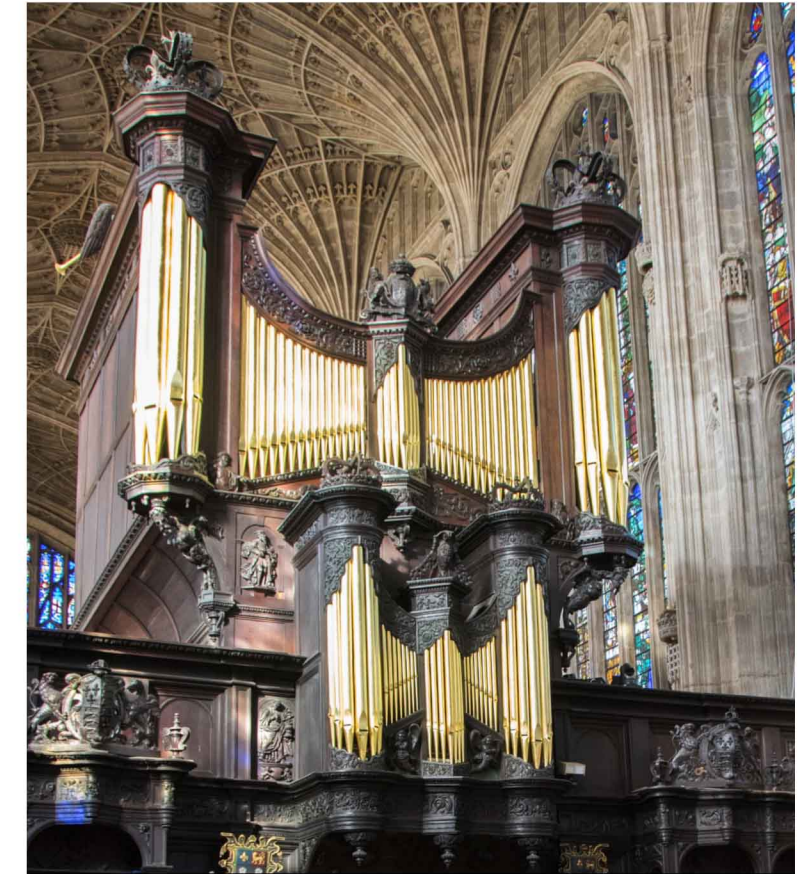
### Organs Before 1950



Exeter Cathedral IV/70



Westminster Abbey, London V/105



King's College, Cambridge IV/79



Ely Cathedral IV/78



St Mary Redcliffe, Bristol IV/64

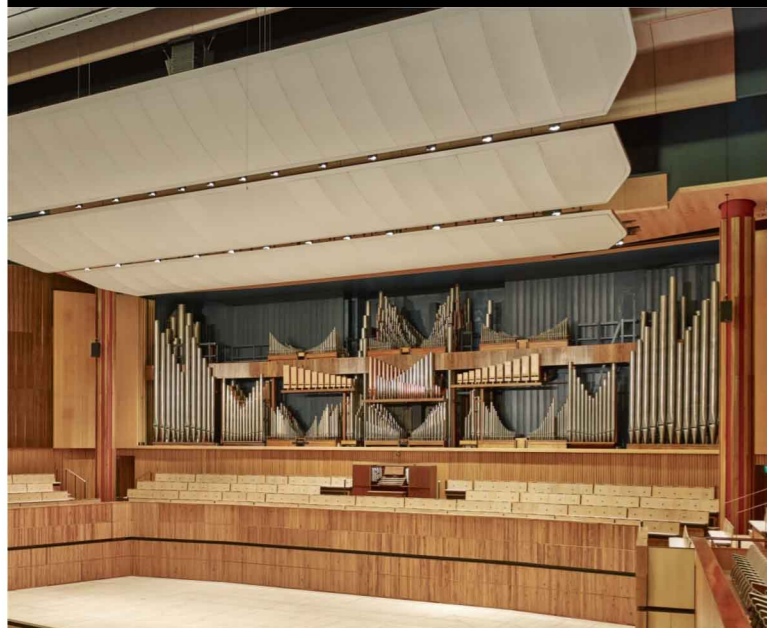
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Organs 1950 - 2000



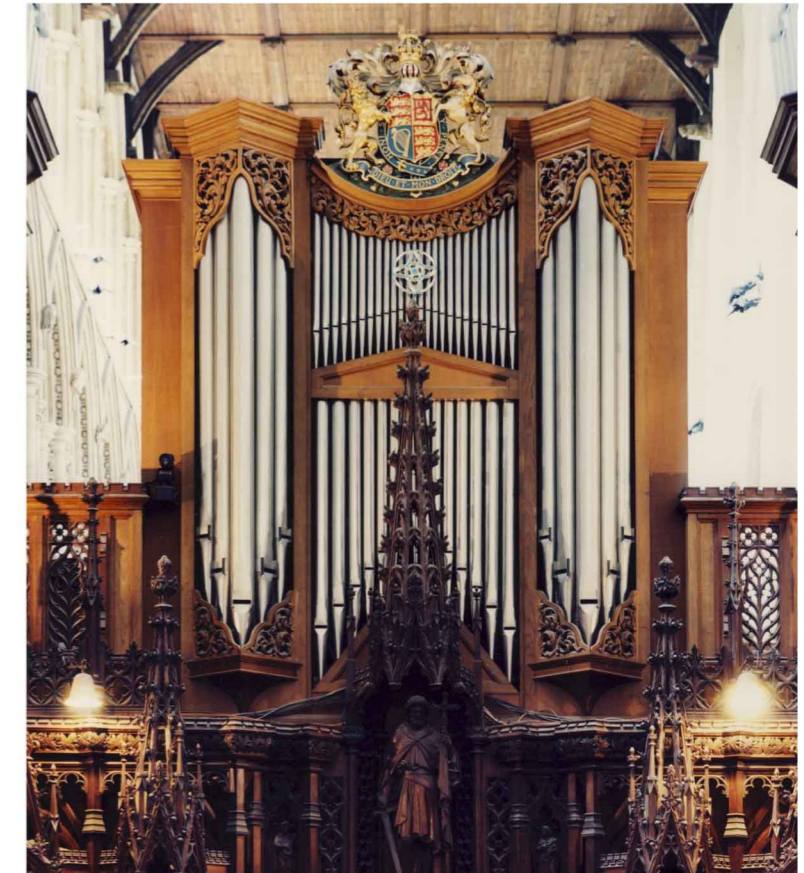
Coventry Cathedral IV/73



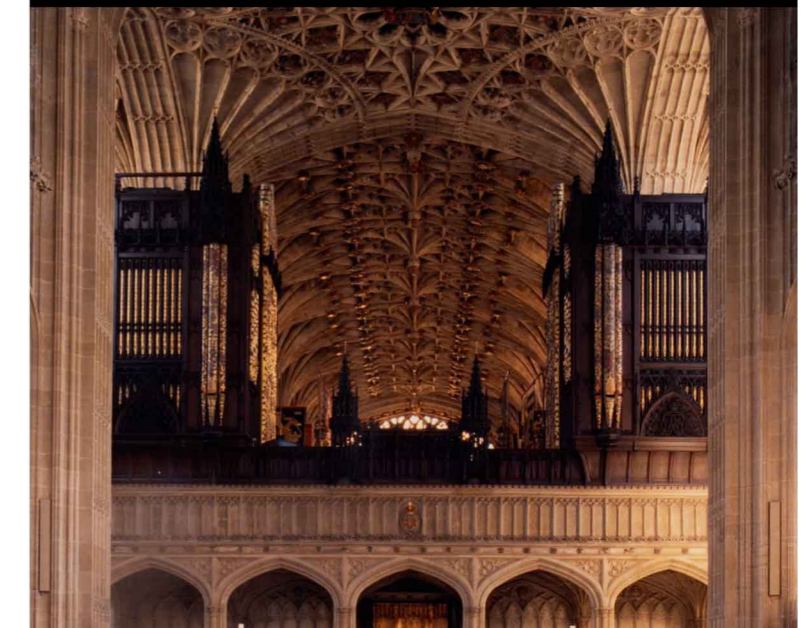
Royal Festival Hall, London IV/103



St Clement Danes, London III/38



St Albans Cathedral (Abbey) IV/64

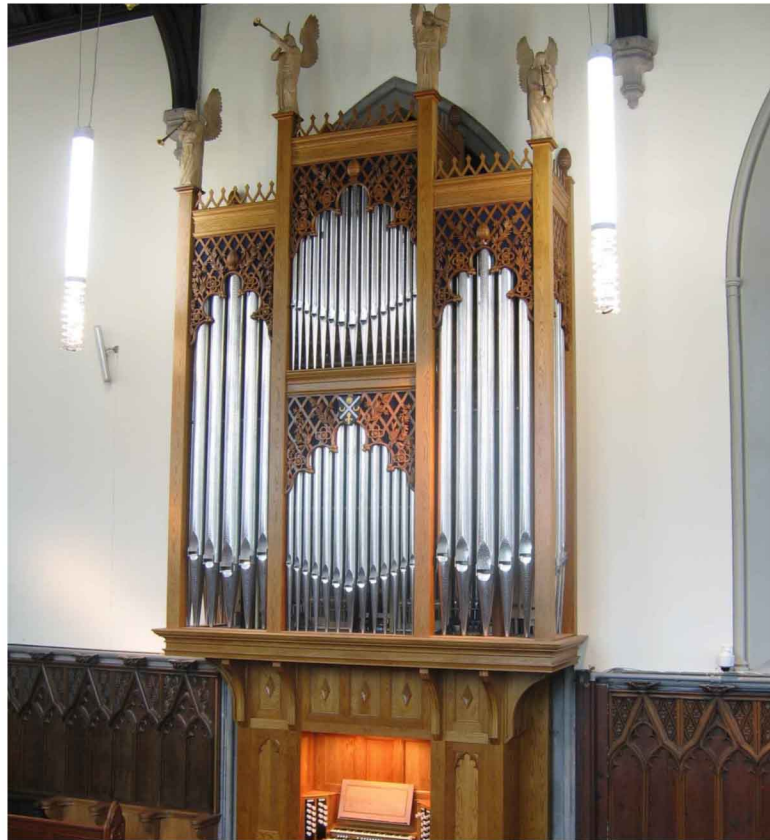


St George's Chapel, Windsor Castle  
IV/72

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Organs since 2000



Glenalmond College, Perth II/26



St David's Cathedral Pembrokeshire  
IV/54



St Edmundsbury Cathedral IV/59



St George's Church, Douglas,  
Isle of Man II/22

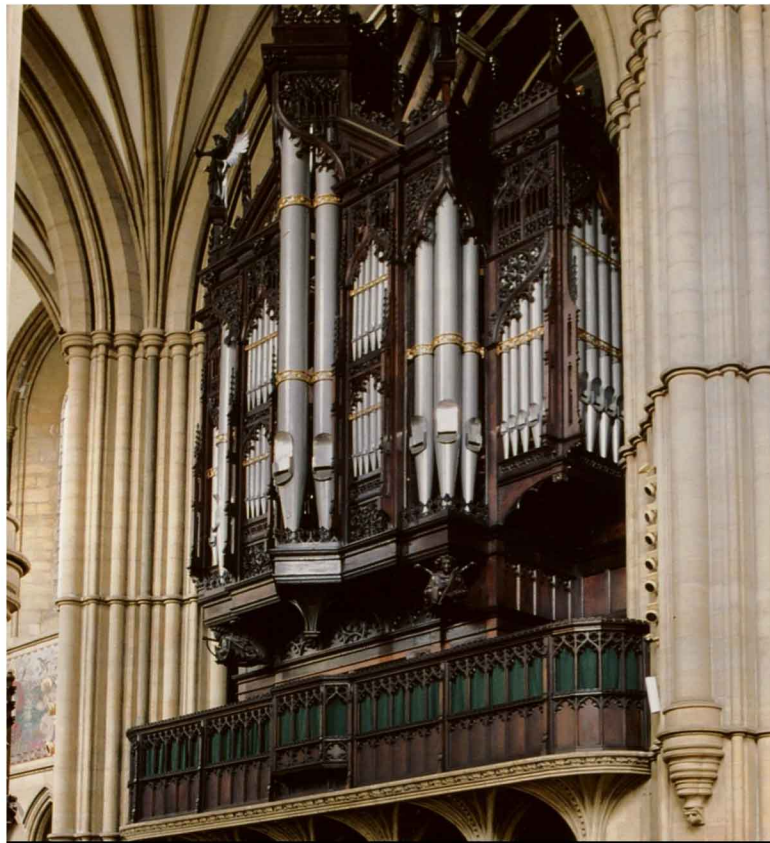


Cirencester Parish Church IV/63

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Organs recently rebuilt or restored



St Bartholomew, Armley IV/57



Lichfield Cathedral with new nave subdivision IV/82



Reading Town Hall IV/37



Usher Hall, Edinburgh IV/63



Stockholm City Hall V/135

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### Recent Tracker Organs



Winchester College,  
Fromond's Chantry II/6



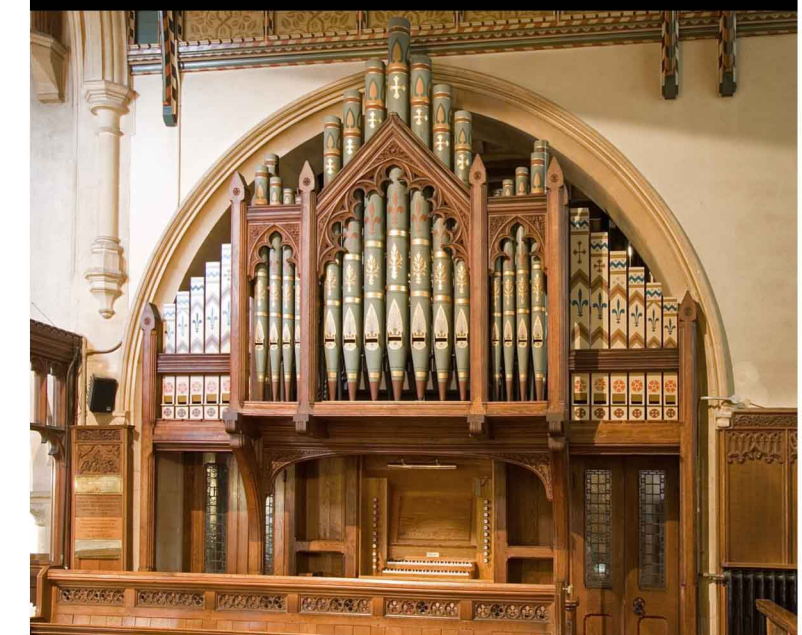
Twickenham Parish Church II/20



Windsor Castle, Private Chapel I/6



St Andrew's Church, Bedford II/22

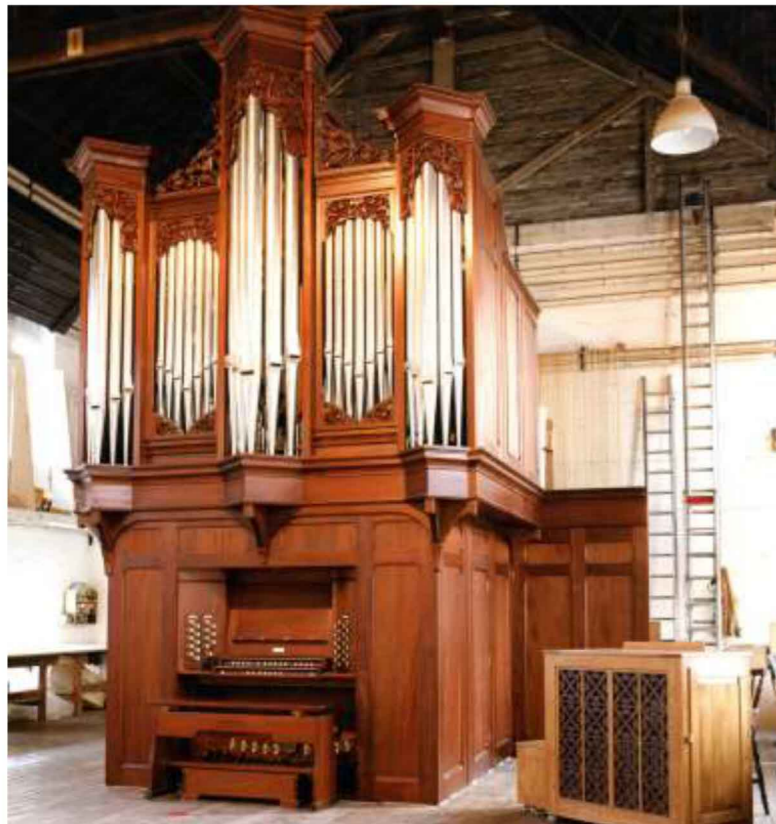


Twyford Parish Church II/18

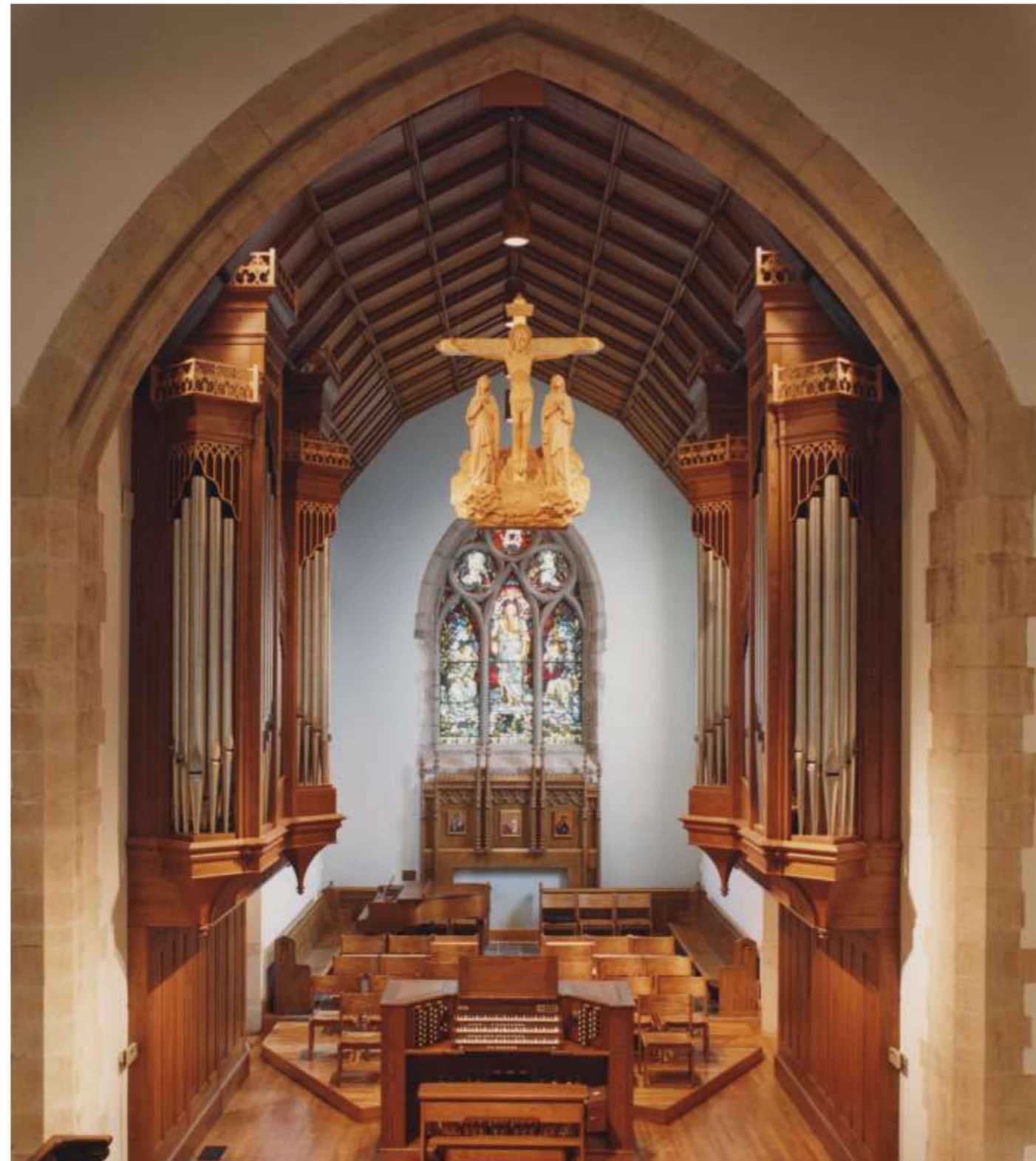
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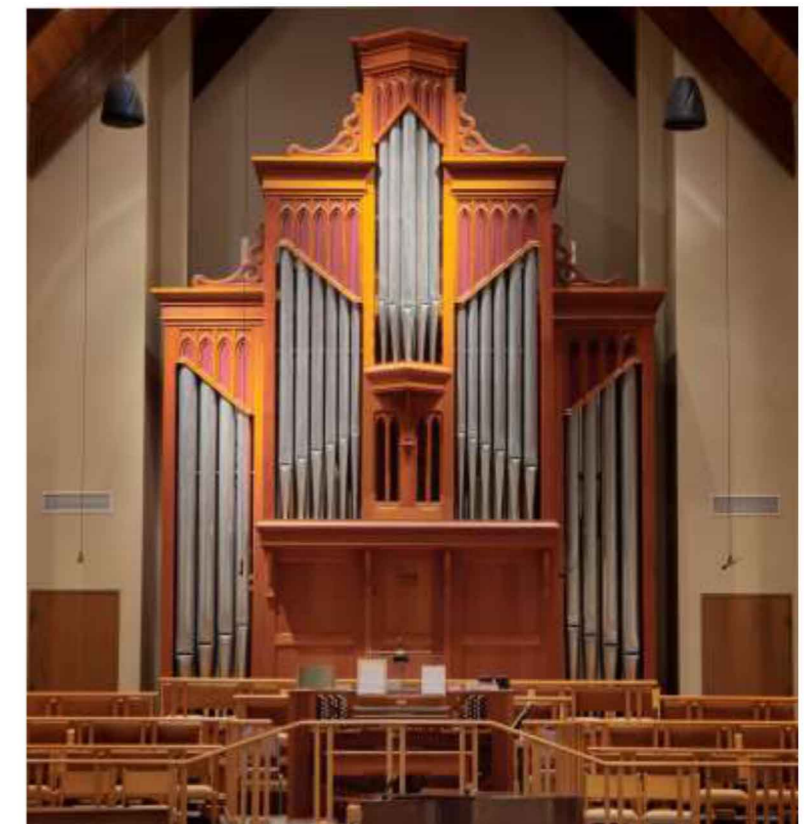
### Organs Overseas



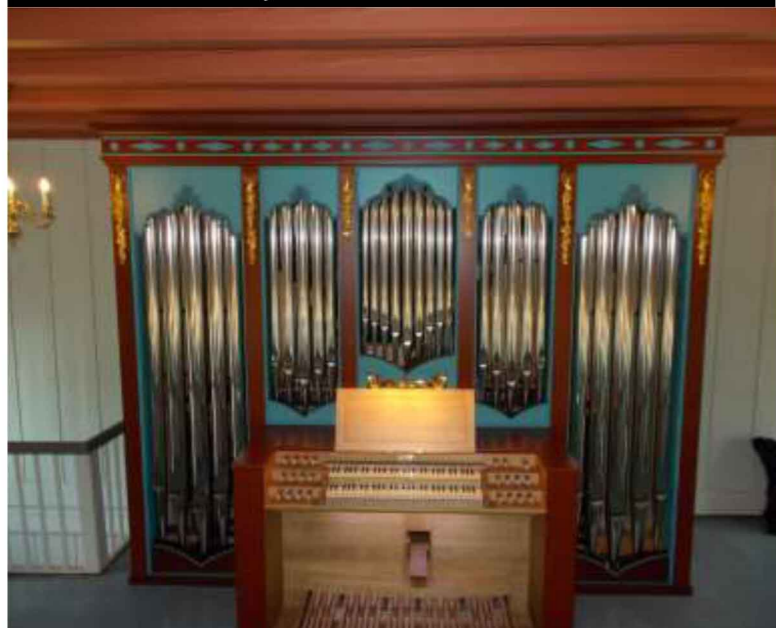
Emmanuel Church, Chestertown  
Maryland USA II/23



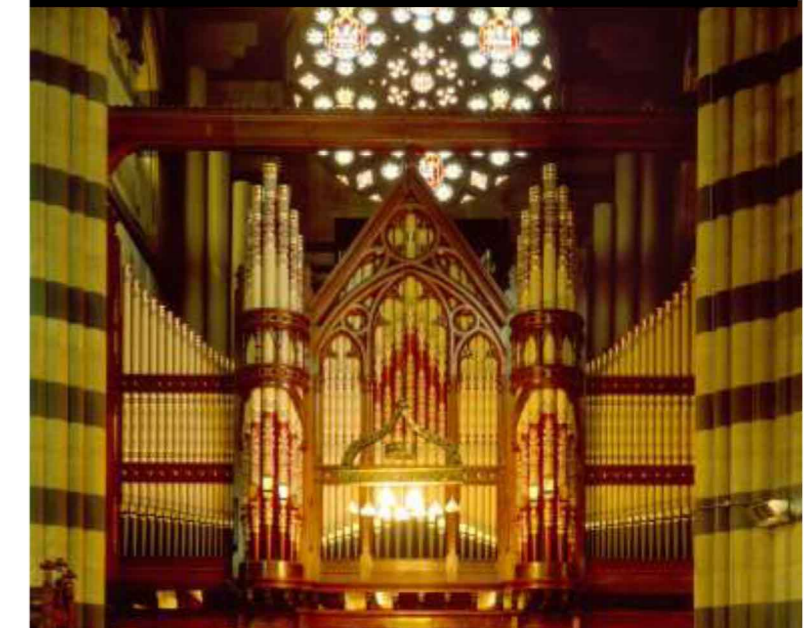
St James's Episcopal Church, Hendersonville, NC, USA III/44



Trinity Episcopal Church,  
Vero Beach, Florida USA III/41



Hakadal Kirke, Norway II/17



St Paul's Cathedral, Melbourne,  
Australia IV/53