Liverpool Anglican Cathedral

Background

Liverpool became an archdiocese in 1880 and from that date the church of St Peter served as Pro-Cathedral. St Peter's church stood in front and to the west of Bluecoat Chambers. It was demolished in 1922 but a brass cross is inlaid in a paving stone in Church Street showing the position of its altar.

A competition for the design of a Cathedral was held in the mid-1880s, the site proposed was that of the existing church of St John behind St George's Hall. However, although a winning design was chosen, the project lapsed and in 1901 a new competition was announced with a new site on St James' Mount. The competition was in two stages and in the first stage architects were not required to present a design, merely to submit a portfolio of their work and sketches of Gothic buildings. The competition required that the new building should be Gothic in style.

After the first stage of the competition a short list of five was drawn up and these were then asked to submit actual designs. The youngest of those short listed was Giles Gilbert Scott who was then only 21 years old, although he was 22 when it was announced that his was the winning entry. Scott's father, uncle and grandfather were all architects. His grandfather, Sir George Gilbert Scott is probably best known for designing the Albert Memorial and the Midland Grand Hotel at St Pancras Station as well as being responsible for most of the restoration work carried out at Chester Cathedral towards the end of the 19th Century. His father, also George Gilbert Scott, designed a number of churches and College buildings in Cambridge and was responsible for most of Dulwich College but was an alcoholic and suffered from mental illness. Young Giles was only 3 years old when his father was declared of unsound mind and he was later quoted as saying that he only remembered seeing his father twice in his life.

In view of Giles Gilbert Scott's very young age it was decided that one of the competition assessors, George Bodley, should act with him as joint architect for the project. The other assessor had been Norman Shaw. Bodley was by then over 70 years old and, not surprisingly, their partnership did not run smoothly. When Bodley died in 1907, Scott re-designed the building although by then the Lady Chapel was well underway and the Choir had been started. The most significant change was for the twin towers over the transepts, from the original competition winning entry, to be replaced by one great central tower.

The layout and notation for the building can lead to confusion because the line of the ridge determined that it would have a North-South axis, however, the altar is conventionally and ritually at the East end of a Christian church and the entrance is at the West end, so, for example, the triumphal entrance facing Rodney Street, which faces almost due North, is called the West Porch. Giles Gilbert Scott is buried in front of this entrance.

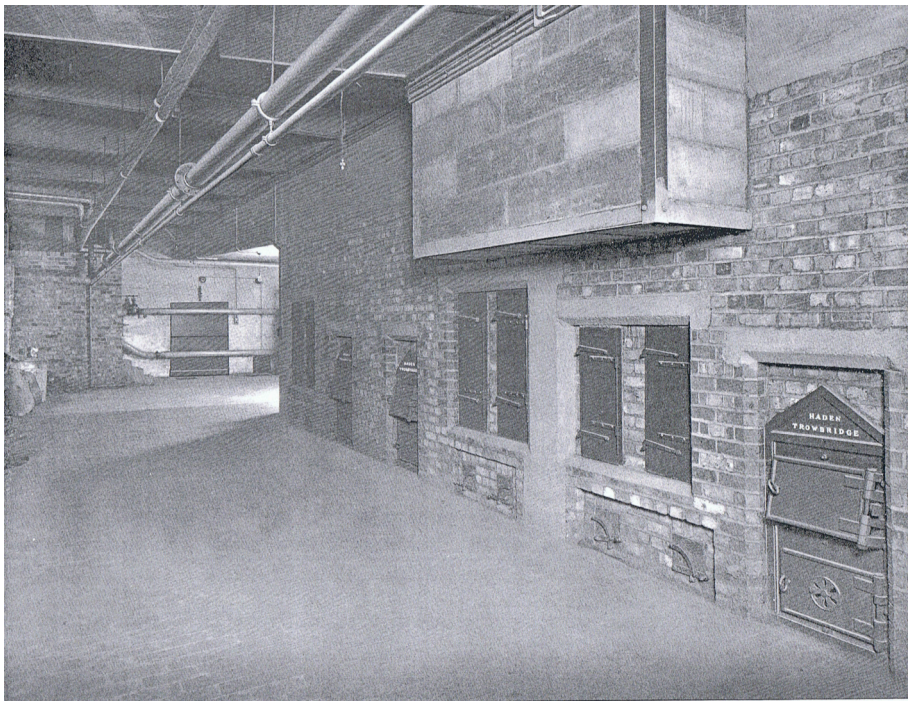
The building structure is concrete and brick with a facing of sandstone from Woolton Quarry. As the sandstone was running out the facing got thinner and this has resulted in numerous cracks in this facing in the last part of the building to be completed. In fact the sandstone became so scarce that some of the ceiling panels at the (true) North end of the building are actually cast plastic made to look like sandstone!

Giles Gilbert Scott's other most notable buildings were the power stations at Bankside (now Tate Modern) and Battersea. He also designed the traditional Red Telephone Box although the curved roof is almost certainly copied from the family tomb of Sir John Soane, an architect whom Scott greatly admired.

Heating & Ventilation

To provide comfortable conditions for occupants of a very high space the logical solution is to heat the floor and the latest part of the building has traditional under-floor heating from hot water in pipes, however, the main part of the building was heated by means of what was probably the largest 'hypocaust' system ever installed anywhere. It may not seem logical to heat such a very large floor area by means of hot air ducts under the floor but a commemorative brochure produced by G N Haden & Sons Ltd in 1924 explains the reasoning behind this.

By 1924 the Lady Chapel, Vestries, Ambulatory and Chapter house were completed and these had been primarily heated by radiators in the conventional way. The radiators had been designed by the Architect to harmonise with the building. The balance of the heat required and the heating of the air for ventilation was provided by Warm Air Stoves consisting of a wrought iron box within a brickwork box. The wrought iron box contained a furnace and the air to be heated was drawn through the annular space between it and the brickwork surround.



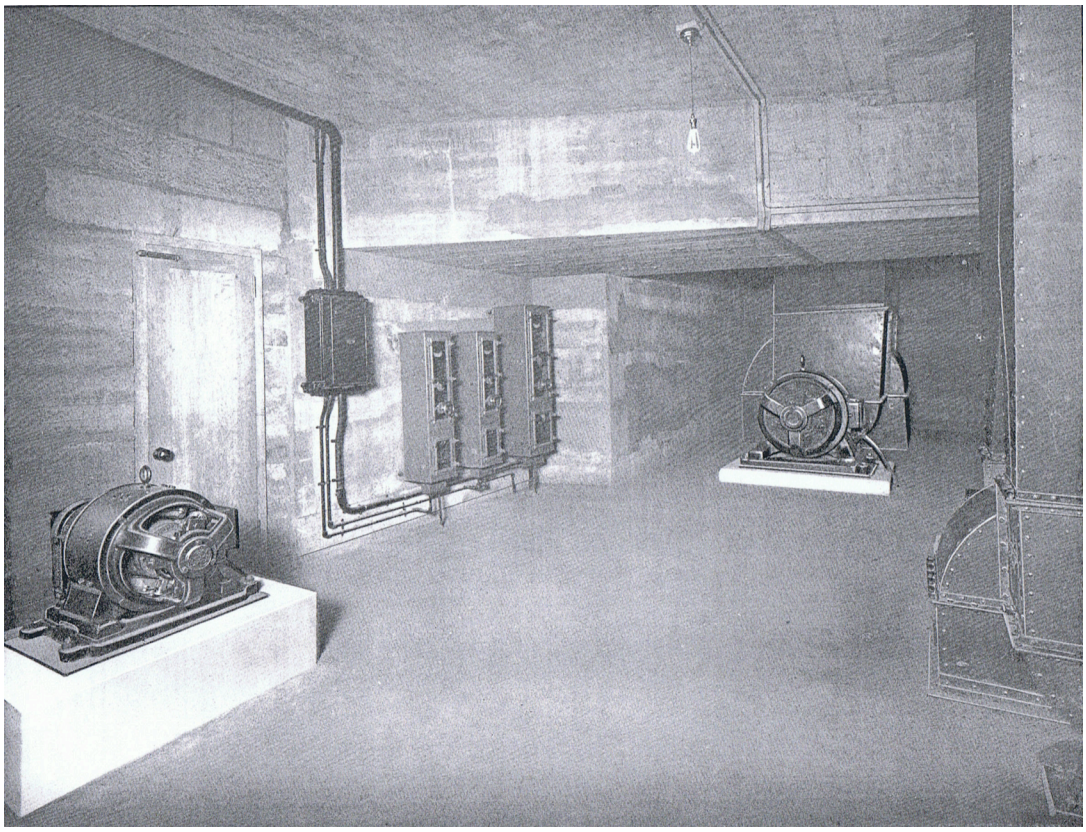
Haden's photograph of one of the 'Warming Stoves' in the 1920s

In 1920 Hadens submitted an alternative scheme for the main building using their patented Warm Floor system. Their brochure compares this system to the Roman Hypocaust system in which the hot gases and products of combustion from a fire outside the room passed under the floor on their way to a number of chimneys built into the wall. In the Cathedral the plan was that almost the entire floor space would consist of a double floor enclosing a system of shallow ducts.

Hadens' brochure describes the system as follows:-

> *The warmed air from stoves, similar to those above mentioned, is circulated through these ducts by an electrically driven centrifugal fan. The system of ducts is a closed one and the same air is circulated continually through the system, so that there will be no accumulating deposit of dust to clean out. There are no steam or water pipes to require attention, nor is there any buried metal work to deteriorate in course of time.*

A large heating chamber is situated under the centre of the Cathedral containing the boilers, furnaces and distribution fans and there is adjacent fuel storage with access from the South Transept. Hot water radiators were also provided at sill level to counteract downdraught from the large windows as well as in the Triforium under the clerestory windows. Ventilation air was warmed to inside temperature by means of a warm air stove and delivered overhead by fan, it was then extracted at low level by another fan and discharged into the churchyard. This must surely have been one of the first applications *ever* of powered ventilation in a cathedral.



This original fan chamber only served the Choir area

This ductwork is on the right in the previous photograph

Other advantages of this system listed in the Haden brochure include:-

1. no interference with furniture.
2. no visible heating elements,
3. no hot surfaces,
4. even distribution of heat,
5. no pattern-staining on walls requiring frequent redecoration,
6. heating can be installed and running as soon as basement is completed,
7. no cutting of walls or floors required for pipes or brackets,
8. no radiators to be, drained, removed and refitted for cleaning/decoration.

The point is also made that the system should be economic in operation since there are no hot surfaces exposed to the atmosphere and so all the heat put into the under floor ducts will be imparted into the space, however, the very slow response time might be considered a major disadvantage.

Update

The hot air underfloor heating appears to have operated successfully for about 60 years, however, at some stage a decision was taken that it was uneconomic and that replacement of worn out parts was becoming too difficult and it was abandoned. The furnaces were originally operated by solid fuel but had been converted to run on oil. The larger ducts are now used as extra storage space and the main Cathedral nave is unheated apart from those radiators installed at the base of high windows to counteract downdraughts. The most recent part of the Cathedral does, of course, have conventional piped underfloor heating.

Abandoned fan chambers have become storage cupboards

Former return air duct – note hollow tile roof

Sources

- Pevsner Architectural Guides – Liverpool; J Sharples, Yale, 2004
- The Heating and Ventilation of Liverpool Cathedral; G N Haden & Sons, c1925
- Private Communications, Maurice Bray, Clerk of Works