

## Stephen Bicknell



*Stephen Bicknell was born in London in 1957 and was educated at Winchester College and St Chad's College Durham. His career in pipe organ building started with NP Mander Ltd of London in 1979. From 1987-1990 he worked with JW Walker & Sons Ltd, returning to NP Mander Ltd as head designer in 1990. He has been directly involved with the design and construction of some of the most significant recent new instruments to be built in Britain. In 1993 he left full-time organ building to pursue a varied free-lance career.*

*His interests in organ history have been expressed in his membership of the British Institute of Organ Studies (BIOS) since soon after its conception in 1976. He has served BIOS as Council Member, Membership Secretary, and as editor of the quarterly BIOS Reporter (1986-1992). He has contributed essays to the annual BIOS Journal and to other publications, and has read papers at conferences in Britain, France, Germany and the United States.*

*In 1996 Cambridge University Press published Stephen Bicknell's The History of the English Organ, a work which has received wide critical acclaim and was the winner of the Nicholas Bessaraboff Prize for the best book in English on musical instrument published in the two year period 1996-7, awarded by the American Musical Instrument Society.*

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## A Concert-Goer's Guide to the Organ

*Behold the wondrous invention of Archimedes! I refer to the hydraulic organ. So many members; so many parts; so many joints; so many wind-tight conduits; so many outlets for the sound; so many musical combinations; so many pipes. And yet all this is only one instrument!*

Tertullian (b.155 AD)

The organ is indeed the most ancient of all keyboard instruments, known in its earliest form in late Greek and Roman society and regarded as a marvel of engineering – 'hydraulic' because the supply of wind to the pipes was steadied by the weight of water in a vessel. The organ seems to have been re-introduced to the West in the eighth century, according to contemporary accounts in the form of a present from the Byzantine emperor to the Frankish king, Pepin the Short. The instrument was seen as a symbol of Roman engineering skills. Its re-introduction marked the revival of civilisation after the Dark Ages, under Pepin and his son, the Holy Roman Emperor Charlemagne. In that pioneering Christian society its natural home was in the new basilicas; thence it became associated ever after with the Church.

In the late middle ages a technological revolution brought new skills to the invention and manufacture of complex machines: from this period come significant developments in mills, clocks – and the development of the early organ into the versatile musical instrument known both to Bach and to today's listeners. By the beginning of the seventeenth century Michael Praetorius was able to devote a section of his great musical encyclopaedia to the description of organs that were in all important respects the same as those we know today.

The organ consists of three main components. First, a means for raising the wind and maintaining it at a constant pressure. Secondly the pipes, which represent not merely different pitches but also different tone colours. Thirdly, a structure on which the whole instrument is arranged and supported and a mechanism to play it.

Organs are all different from each other. They vary in size from small portable instruments that might stand on a table to the mighty technical marvels of the nineteenth and twentieth centuries, some with many thousands of pipes. Different types of organ perform different functions. Traditional instruments serve the church and its liturgy, according to different schools of thinking divided by period and by geographic location – thus an organ familiar to François Couperin might have been somewhat baffling to J.S. Bach, and vice versa. Other types of organ have found their way on to the street and fairground, played automatically by punched cards, or into the cinemas of the 1920s and 30s, originally to accompany silent movies but soon becoming an entertainment in their own right.

The organ at the Royal Festival Hall, completed in 1954, is an individual creation of its designer, Ralph Downes and its builders, Harrison & Harrison Ltd of Durham. It shares its main features with other organs of traditional design. The player sits at a keydesk or console where he is faced with several keyboards for the hands and, in addition, a pedal keyboard which is played with the feet. Each keyboard corresponds to a group of pipes within the organ, with its own identity and placement.

The Festival Hall organ displays these possibilities well. The four manual keyboards control five separate departments. The second keyboard up controls the Great Organ – the main chorus of the instrument and the backbone of its musical effects. The pipes are placed on two levels slightly to the left of centre. The secondary chorus, or Positive Organ is at home on the lowest keyboard and its pipes are slightly to the right of centre, again on two levels. The third manual up controls the Swell Organ, on the left side, entirely enclosed in a large box with louvres on the front. These can be opened or closed with a pedal, rendering the department expressive. The top row of keys controls the Solo Organ, on the far right, also housed in an expressive enclosure with louvres operated by a pedal: in this organ the enclosed departments Solo and Swell are related to each other as primary and secondary divisions respectively, balancing the unenclosed Great and Positive. A fifth division, the Choir Organ, is also enclosed in an expressive box with louvres and is situated to the right of centre. It is playable either from the top or bottom row of keys and includes a further range of effects, some of a delicate character. Finally, the pedal keyboard controls its own division of pipes: the largest basses on the Pedal division include the largest and lowest-sounding pipes in the organ, visible at the extreme left and extreme right of the pipe array. The remainder of the pedal pipes are located in the centre at the lower level, and the whole department is unenclosed.

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In addition, by means of couplers, the player may operate various combinations of departments from one or other of the manual keyboards, and the manual keyboards may be coupled in turn to be played from the pedals.

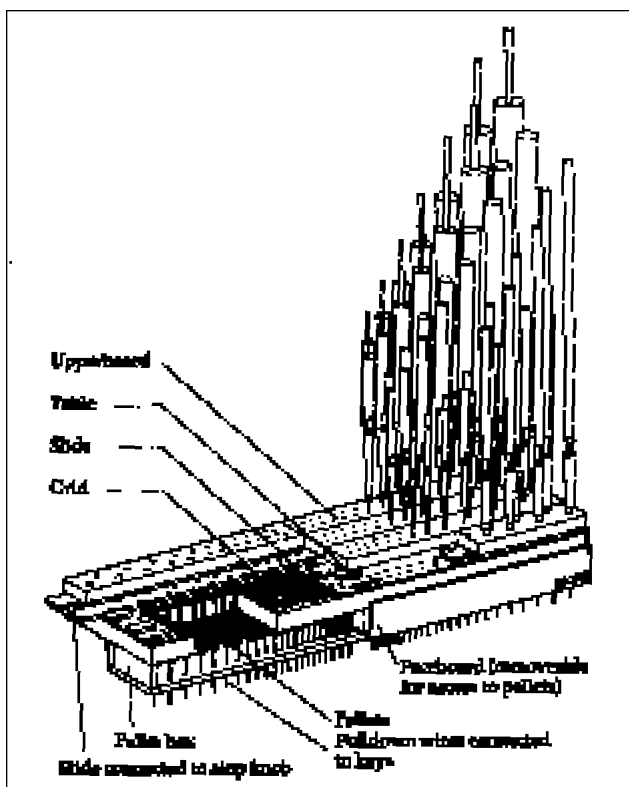
Each department of the organ has its own group of stops, operated by the characteristic stop-knobs arranged on either side of the keys. Each stop controls an entire set or rank of pipes, one for each note on the keyboard, of a particular type. The colours of the organ may be divided into four main categories.

The Principals are open cylindrical pipes of typical organ-pipe shape and are usually arranged to form the facade in conventional organ design. In all fully-developed organs they are provided at various pitches to build up into choruses: as well as unison ranks, there are ranks at the octave and the octave below, ranks two octaves higher, ranks sounding the fifth and even the third and, in stops called 'mixtures', they sound in harmonically-related clusters, several pipes to a note. This rich and daring use of compound harmony is the centrepiece of organ sound and gives it a rich complexity and nobility obtainable in no other way.

In addition to the principals there are wide-scaled stops or 'flutes', which may be constructed in various ways (open cylindrical, open tapered, stopped cylindrical, etc.) and can be made of metal or of wood. These flutes build up into subsidiary choruses of their own character, again at various pitches on each department.

Then narrow-scaled stops, which include faintly-imitative 'string' voices, again present at various pitches on each department. All the voices described so far are produced by pipes which function in the same way as a simple whistle – there are no moving parts.

A view of a soundboard



The remaining category are the reeds, where the sound of a vibrating brass tongue is amplified by a shaped and tuned resonator, and these stops cover a range of sounds from the piquant or bucolic through to fiery trumpets that lend grandeur to the louder effects.

The mechanism linking the keys and stops to the pipes within is in this instrument electro-pneumatic (traditionally organs often have an entirely mechanical key and stop action, but there are various systems in use). Messages are sent from the console via low-voltage cables to a control centre of switchgear performing functions similar to a telephone exchange. The message is then used to operate a series of pneumatic relays, which have the advantage of being small, silent, quick and powerful – and of course harness the power of pressurised air already available from the organ bellows.

Yes, there are still bellows in the organ. The wind is raised by fans driven by electric motors, but traditional leather-hinged bellows are used to steady the supply and to store the wind at various pressures ready for instant use when required. Finally, the layout and appearance of the organ. The Royal Festival Hall organ has its own personal 'look', partly born out of Modern Movement ideals that held sway at the time it was built. Traditionally

organs were housed in architectural casework, originally to keep out dust and rats but gradually becoming an artistic and symbolic device in their own right. By the twentieth century that tradition was in decline, most new organs being screened by a characterless fence of longer bass pipes. Mid-century a handful of designers, especially Walter Holtkamp in America, realised the design potential of an organ where the pipes are entirely on show – making a virtue of the extent of variety in size and form. Downes's design for the organ owes something to American practice, both in its musical provision and in its elegant modern appearance. In effect, its interior is exposed to view, so that its form follows from its function and it is unencumbered by casework or decoration. From the auditorium there are far more pipes visible than in most concert hall organs.

There are over 7,500 pipes in this organ, some of wood but most made of alloys of lead and tin: the largest has a speaking length of about 9.75 metres (32 feet), the smallest about 10mm (less than half an inch).

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