

## Science in culture

## Eastern promise

The Queen Anne churches in east London were precisely aligned on an east–west axis.

Heike Langenberg

In 1714, Edmond Halley, professor of geometry at the University of Oxford, added the finishing touches to his latest paper, on “the variations of the magnetical compass” (*Phil. Trans. R. Soc. Lond.* **29**, 165–168; 1714). Halley, best known today for the comet that bears his name, was interested in a wide range of fields, including astronomy, meteorology and geomagnetism.

Around the same time, the foundations of two new churches were laid in east London: Christ Church Spitalfields and St Anne’s, Limehouse (right). Both buildings were aligned with remarkable precision on an east–west axis.

In a forthcoming paper in the *Journal of the Society of Architectural Historians* (**64**, 56–73; 2005), geologist Jason Ali and historian Peter Cunich suggest that Halley put his work on declination-corrected compasses into practice in surveying the two churches. They argue that this may have been the first time that this modern science-based technique, which corrects for the difference between magnetic and true north, was used to align buildings.

Christ Church Spitalfields and St Anne’s, Limehouse, were constructed under a programme established by two acts of parliament in 1711 and 1712 to build 50 churches in London’s rapidly expanding East End. The programme was an attempt to fight irreligion and the rise of the dissenting churches in the poor suburbs.

The parliamentary acts were passed in the reign of Queen Anne when the Tory party was in power. It was in the Tories’ interest to strengthen the Church of England because the parliamentary opposition party, the Whigs, were supported by religious dissenters. The buildings were specifically commissioned to be aligned in the traditional way along an east–west axis, emphasizing the link between the Anglican church and early Christianity. In the end, only 12 churches were built, partly



owing to financial constraints and partly because the political balance changed after the death of Queen Anne in 1714, when the Whigs became the dominant party.

The commission for building the new churches appointed Nicholas Hawksmoor as one of its architects. Hawksmoor had been a student of Halley’s fellow Royal Society member Christopher Wren, who is most famous for designing St Paul’s Cathedral. Halley and Hawksmoor had shared a circle of friends since the 1680s.

Traditionally, the alignment of churches had

been achieved by using the position of the rising or setting sun on particular days: Easter, the feast day of the church’s patron saint, or one of the equinoxes. But this approach cannot explain the precision in the alignment of Christ Church Spitalfields and St Anne’s, Limehouse.

At London’s latitude, the seasonal range of sunrise is quite large, from 51.5° at the summer solstice to 128.5° in mid-winter. Even a few days before or after the equinoxes, the sun rises and sets significantly away from a precise east–west axis. And by 1714, the Julian calendar — still in use in England until 1752 — was out of synchrony with the seasons by 11 days.

Under the same parliamentary acts, Hawksmoor constructed four more churches whose axes are not oriented precisely east–west: St Alphege’s in Greenwich, St George-in-the-East in Wapping, St George in Bloomsbury, and St Mary Woolnoth in the City of London. But each of these was built on a site with physical constraints that would have made attempts at correct orientation difficult. In the case of St-George-in-the-East, Hawksmoor had petitioned to knock down adjacent houses to open up the site, but without success.

Halley was active in the building commission in the summer of 1714, attending meetings and visiting sites. The foundations for Christ Church Spitalfields, and St Anne’s, Limehouse, were laid during that summer. It seems extremely likely that Halley collaborated with Hawksmoor to assure their precise alignment with the help of his declination-corrected compass.

Ironically it has become difficult to determine the direction of east in some parts of London today. Magnetic noise, from the London Underground for example, can lead to significant local distortions of the geomagnetic field.

Heike Langenberg is a physical sciences editor at Nature.

Not content with overturning the public’s view of science, Watson has also had a major influence on science textbooks. His *Molecular Biology of the Gene* established a new style for textbooks — using concepts as crossheads, for example — which has been much copied. Gavin Borden, publisher of the 63-volume *James Joyce Archive*, was keen to publish college biology textbooks and approached Watson. They began assembling authors, who gathered at Watson’s home at

Martha’s Vineyard in the summer of 1978, and *Molecular Biology of the Cell* was born. Experts who reviewed chapters were sure it was too difficult to be an undergraduate text, but Watson was convinced that it was just what was needed — and he was, of course, right. It is both beautiful and enormously successful.

*The Writing Life of James D. Watson* provides valuable insights into the process that led to this success. His contribution to

solving the structure of DNA was highly significant, but if he and Crick had not worked out the structure, Franklin and Aaron Klug would have done so soon afterwards. Watson himself regards his writing, which could not have been done by anyone else, as an even greater achievement than his work on DNA that led to a Nobel prize. ■

Lewis Wolpert is at the Anatomy Building, University College London, Gower Street, London WC1E 6BT, UK.