

SCIENCE IN ART

Works in the National Gallery
that illustrate the history of
science and technology

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human additions to the landscape, of no particular visual interest, and in the earlier period artists seem often to have left them out of their pictures, probably in rather the same spirit that a photographer today might try to take a view that avoided including a line of pylons. This attitude seems, however, to have been less common in the Netherlands. There are, for instance, pictures by Ruisdael which take mills as their subject. In any case, Romantic painters gave more importance to human contributions to landscape. There is accordingly a continuing debate about how far the Impressionists, who worked (they said) directly from nature — 'in the open air' (*plein air*) rather than in a studio — should be seen as making a social comment, or indeed as departing in an important way from the work of, say, Constable.

These technological categories were developed as we made our way round the Gallery. Our scientific categories were largely developed earlier — ideas in pictures being more elusive elements than fire irons. One obvious category was that of pictures which had direct scientific connections: portraits of natural philosophers, physicians and so on. We also found that there were a few pictures showing scientific instruments or scientific activity of some kind, the most spectacular being Joseph Wright's fine picture of a scientific lecturer demonstrating the use of the air pump (NG 725). In tribute to their significance, we put these pictures in a category of their own. In addition, we have considered three categories of pictures that put scientific information or techniques on display in rather different ways. The first such category we have called 'Mirrors'. It is somewhere between what would now be called art and science since we have put into it those pictures that seem to us to show a particular concern with specular reflection, a phenomenon whose mathematical rules had been known since ancient times. The next, more narrowly scientific, category is that of paintings which have a connection with scientific matters, for instance, the use of careful perspective construction (Saenredam's painting of the interior of the Great Church at Haarlem, NG 2531) or the display of a detailed map (in a portrait by Pompeo Batoni (1708 - 1787), NG 6459) or of a rhinoceros (in a genre scene by Pietro Longhi (Pietro Falea, 1702 (?) - 1785), NG 6459), or even the wilful neglect of scientific information (the rendering of the Moon in a picture of the Immaculate Conception by Velázquez (1599 - 1660), NG 6424). Our final scientific category is that of pictures showing meteorological phenomena.

We were chiefly concerned with paintings in the Gallery, but it would have been perverse to omit the floor mosaics by Boris Anrep (1885 - 1969) which form part of the Gallery building itself. However, since they are considerably later in date than most of the works in the Gallery's collections, and since their representations of people and things are inevitably rather schematic, we have included them in a separate category, at the end of our series of lists.

The list of pictures in each category is in date order, and is preceded by a short introduction. The introductions do not pretend to give more than a very cursory account of the relevant parts of history of science and technology. Their chief purpose is to explain where the particular pictures concerned may be considered to fit into this history. Issues of art history have been discussed only when it seemed imperative to do so. The chief instance of such discussion is in the introduction to our section on Domestic and Low Technology. Since our own time is almost fanatical in its devotion to correct historical reconstruction for the settings of works of fiction (at least on film or on television), it seemed as well to look briefly at earlier attitudes before presenting pictures as evidence. Both introductions and entries for specific pictures give references to more detailed scholarly literature where appropriate. We have not given references to general histories or to monographs on particular artists.

As the introductions to each section make clear, most of our lists are not intended to be exhaustive. Some, in particular, we hope may encourage visitors to look more carefully at other pictures (in the National Gallery and elsewhere) to see whether they might perhaps be understood as showing some of the properties that led us to include pictures in one or another of our lists. We do not believe that readers necessarily start by reading Introductions, so — at the inevitable cost of some slight repetitions of information — entries for particular paintings have been made as self-contained as possible.

4. Scientific information

In this section we have included pictures which show something of the scientific information that the painter has incorporated into his work.

In several of these pictures, the painter would probably not have considered the information concerned as an important component of his work, but our distance in time gives the image a significance it did not have in its own day. For instance, in his picture of Christ of the Apocalypse (NG 579a, entry 4.1), Giovanni da Milano is merely displaying the standard fourteenth-century theory of the cosmos by showing the heavens as a blue sphere patterned with stars. The interest of this image is that it is, in fact, more literal to the scientific truth of its day than may at first appear to the modern viewer of Giovanni's picture. Similarly, a detailed study of Filippo Lippi's *Annunciation* (NG 666, entry 4.5) has shown that it displays some characteristically fifteenth-century ideas about light and its properties. On the other hand, in spite of the rather naturalistic style of the picture as a whole, Velázquez' depiction of the Moon in his *Immaculate Conception* (NG 6424, entry 4.9) is decidedly not in accord with early seventeenth-century astronomy.

Other pictures have been included in our list because they show an interest in the scientific knowledge of the world, for instance in displaying maps (for their use as household decoration, see Alpers, 1983) or in recording the public display of a rhinoceros in eighteenth-century Venice (NG 1101, entry 4.13).

We have also included Holbein's *The Ambassadors* (entry 4.7), for its anamorphic perspective of a skull (presumably drawn with the help of some kind of perspective instrument), as well as a few pictures and a peepshow which display a grasp of the scientific principles of perspective, or at least a serious interest in them. (On perspective instruments and painters' sometimes cavalier attitude to perspective see Kemp (1990), and Field (1997).)

We have omitted references to pictures which show inherently non-identifiable phenomena. One such is Dürer's *St Jerome* (NG 6563) whose reverse shows what seems to be a catastrophic event, possibly involving a fireball. It has been suggested that Dürer has shown a comet. We can see no reason for this identification. At the time the picture was painted (about 1495), comets were considered to be relatively small scale meteorological phenomena, whose significance was as portents rather than as catastrophes, or direct causes of catastrophes, in their own right. Thus this scene, which is presumably connected with the end of the world, seems more likely to refer not to a comet but to one of the greater events described in the book of *Revelation*. It does not appear to be an attempt to give an exact account of any particular natural phenomenon.

4.1 Giovanni da Milano (active 1346 - 1369(?)), *Virgin, Christ of the Apocalypse and St John*, each panel 90 x 38 cm.

These panels are part of an altarpiece. Christ is shown holding a symbolic representation of the heavens, in the form of a blue globe with golden stars on it. At this time, in the Christian West, it was generally believed that the 'fixed stars', that is those that made up the patterns of the constellations, were attached to a sphere which rotated once a day. Below that sphere were the spheres carrying the planets. The Earth was at rest in the centre of the system. That is, the Earth was in the lowest and humblest place in the Universe, furthest from the highest heaven — above the sphere of stars — which was the home of God and His angels. This cosmological system is a christianised version of the Ancient geocentric system derived from the natural philosophy of Aristotle (384 - 322 BC) and described in terms of technical astronomy in the *Almagest* of Claudius Ptolemy (fl. AD 129 - 141).

For a sixteenth-century representation of the Universe, see entry 2.1 above.

an interest in much of the scientific activity of his time — though he does not seem to have owned any books by Galileo (who had been condemned by the Inquisition in Rome as 'vehemently suspected of heresy' in 1633 — so his books were not likely to be acceptable in ultra-Catholic Spain). However, Velázquez did own several general works on astronomy, any one of which would have told him that the moon was not in fact as he had shown it in this picture, and there is reason to suppose that his elementary education would have included this kind of information.

References: Sanchez Cantón (1925); Field (forthcoming); Kemp (1990).

NG 6424. ■ Plate, of whole + detail to show Moon

4.10 Carel Fabritius (1622 - 1654), *View of Delft*, dated 1652, 15.4 x 31.6 cm.

Fabritius was Rembrandt's most gifted pupil. The National Gallery also has a fine self portrait by him (NG 4042, signed and dated 1654). This view of the city of Delft, apparently designed to be seen not flat but curved, may have formed part of a peepshow. The exact location of this view can be identified. The picture shows a canal with a bridge.

NG 3714.

4.11 Samuel van Hoogstraten (1627 - 1678), *Peepshow, with Views of the Interior of a Dutch House*, 58 x 88 x 63.5 cm.

Through the viewing holes one sees the interior of a house. Examining the inside of the box reveals a quite complicated use of perspective to achieve this illusion.

NG 3832. ■ Plate, of detail

4.12 Jacob Ochtervelt (1634 - 1682), *A musical party*, probably 1675 - 80, 84.5 x 75 cm.

There is a map, rather vaguely rendered, hanging on the back wall of the room. At this period, maps were often hung on walls as decoration.

NG 3864.

4.13 Pietro Longhi (Pietro Falea, 1702 (?) - 1785), *Exhibition of a Rhinoceros at Venice*, c.1751, 60.4 x 47 cm.

The animal shown is a young female great Indian rhinoceros that was owned by Captain Douwe Mout van der Meer. It was shown in various places all over Europe for about twenty years. The animal's horn has apparently been broken off (possibly accidentally) and is being brandished by one of the spectators. Exotic animals had been an attraction at least since the days of Ancient Rome, and they appear in many pictures in the National Gallery (for instance there are two cheetahs in Titian's *Bacchus and Ariadne*, NG 35). Longhi's picture is significant in showing an exhibition of an animal as a scene (or a social event) in its own right (compare Wright's *Air Pump*, NG 725, entry 2.6 above). Moreover, care seems to have been taken to make an accurate record of the appearance of the rhinoceros.

Reference: Clarke (1986).

NG 1101.