

Behind the Picture

When we visit an art gallery and look at an old painting we take it for granted that what we see is exactly what the artist painted a few hundred years ago. But old paintings, more often than not, look rather different now from how the artist intended.

If we want to know about the real history of paintings – what the artist intended it to look like, what techniques he/she used, how it's been changed over time – then we need to look at the science. We need to look behind the picture.

Every major gallery has a scientific department, or easy access to scientific knowledge. Indeed, the Royal Academy schools in London have had a professor of chemistry on the staff for 150 years.

Modern techniques are used to let people know more about the materials and methods that artists used to achieve their effects. The scientists' discoveries aid conservation, and, where absolutely necessary, restoration.

Some materials have changed over the centuries, often because of irreversible chemical changes caused by interactions of paint with oxygen, atmospheric pollutants or light.

Modern techniques mean the scientists can investigate what we can see, as well as what lies below the surface. Some of these techniques only need a microscopically small flake of material; others are completely non-destructive.

Artists' limitations

The materials available have always limited what an artist can do. For example, they used egg yolk as a medium for paint ('egg tempera'). Its rapid rate of drying meant short brush strokes and successive thin layers. Media based on oils (linseed, walnut or poppy) allowed the artists greater freedom and techniques such as impasto and 'wet-in-wet'. Also, earlier painters had only a limited range of pigments available. Some of these were 'lake pigments', which means they were soluble, natural dyestuffs absorbed on freshly precipitated alumina. This gave them insolubility so they could be used as pigment.

Many of these lake pigments were 'fugitive' – they faded in light. Around the year 1800 the French government – although fighting major wars against the British and other European countries – gave money to inorganic chemists to discover and develop new pigments. Some art historians have argued that without the contribution of these chemists the Impressionist revolution could not have happened.

The co-operation of science and art

Leonardo da Vinci was not only a supreme artist – he was a wonderfully observant and creative scientist/engineer. No single individual has achieved as much in both fields since, but there have often been close links.

A recent example of close co-operation between a scientist and an artist involves Frances Ashcroft, a professor of physiology at Oxford University. Her work on insulin (the hormone secreted by the pancreas, without which we suffer from diabetes) has been interpreted and exhibited in a series of powerful paintings



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What you need to do

You have been provided with two resources.

An account of Renoir's **Boating on the Seine**. This discusses scientific and art-historical issues at an accessible level, except that technical terms in both art and science are printed in **bold**.

A brief paper on The Portrait of Alexander Mornauer. This is written for a more 'scientific' audience, and demonstrates the range of techniques available as well as showing how the art world sets about trying to solve problems of origin and provenance.

Boating on the Seine:

Find out the meanings, or correct formulation, of all the terms in bold.

Carry out a study of the influence on artists of the availability of materials. Alternatively, a study of the 'new' colours by French painters of the 19th century. (Van Gough may be of particular interest).

The Portrait of Alexander Mornauer:

You will need to carry out some research in order to use this paper as a model for a study of another painting of your choice.

Resources which might help you:

The Chemistry of Art, text by Martyn Berry, Anthea Peppin and Colin Osborne. Royal Society of Chemistry/The National Gallery (1999). £19.50 + postage from Mrs Sandra Abraham, Education Department, The Royal Society of Chemistry, Burlington House, London W1V 0BN.

The pack contains 10 A3-sized high-quality reproductions of paintings (from 14th to 19th centuries) and four substantial booklets: A Guide to the Pack (including glossaries); The Paintings (fully illustrated); Experimental Section; and The Colour Supplement (an account of the biology, chemistry and physics of vision and colour vision; how colour is caused; and a condensed pictorial history of pigments).

Selected websites

All major galleries have their own websites.