

# PROFESSOR ENZO FERRONI

## Leading art conservation scientist

**T**he present intense activity in conserving the medieval paintings on the walls of Santa Croce Basilica in Florence (*La Leggenda della Vera Croce* by the 14th-century painter Agnolo Gaddi), and indeed the restoration work of murals in churches across Italy and throughout the world, relies heavily on the ingenious innovations of Enzo Ferroni and his colleagues in the Department of Chemistry at the University of Florence.

Wall paintings degrade as a result of the slow transformation of the binder calcium carbonate, deriving from the carbonation of the calcium hydroxide (slaked lime) used by the artist, into the hydrated sulphate of calcium (known as selenite), by the action of polluting sulphur dioxide and oxygen. This process, known as sulphatisation, results, *inter alia*, in the loss of colours and of the cohesion of the paint layers to the underlying substratum with the consequential formation of "blisters".

This is the damage that could be seen on the face of St Dominic in Fra Angelico's *St Dominic in Adoration of the Crucifix* in the cloister of San Marco, Florence, before the convent's 15th-century frescoes were restored in the late 1960s and 1970s using methods pioneered by Ferroni.

Ferroni, a surface and colloid scientist, showed how such paintings could be restored by a carefully planned chemical protocol. This entails the removal of the patina of selenite by administrating, first, a poultice of ammonium carbonate and then a treatment with barium hydroxide to consolidate the painting. The pro-

cess was explained in a classic paper in 1977, published in *Scritti di storia dell'arte in onore di Ugo Procacci* ("Writings in honour of Ugo Procacci"), and co-written with his colleague Dino Dini, one of the leading fresco conservators in the world.

The friendship and scientific cooperation that flourished between Ferroni and Dini had its genesis in a grave emergency – the catastrophic Florence flood of 1966. With the formulation of the technique described above, the Ferroni-Dini method thereafter also became known as the Florentine technique. It heralded a radically new vision with regard to the procedures of conservation and restoration of works of art, one in which scientific insight and practical action merged, spawning the important sub-discipline of scientific conservation. Enzo Ferroni was a pioneer in perceiving the advances that scientific principles and practice could play in the conservation of cultural heritage, especially paintings.

Ferroni's own contributions included a thorough diagnosis of the damaged or decaying artefact, an achievement that required, ultimately, the deployment of spectroscopy, diffraction and other techniques of modern chemistry and chemical physics. Moreover, Ferroni knew that the burgeoning fields of materials science and technology would inevitably play a critical role in the conservation arena. His co-operation with the Nobel laureate Giulio Natta convinced him that this branch of science would be a fundamental reference point for future conservators.

In Ferroni's pioneering days his laboratory was bereft of the tools and techniques now deemed essential for



Fra Angelico's 'St Dominic' at San Marco, Florence, before and after restoration using techniques developed by Ferroni

the kind of work he pursued: he had no lasers, no infra-red (Fourier transform) spectrometers, no particle accelerators and none of the sophisticated chromatographic or mass-spectrometric equipment now in use.

Ferroni belonged to that breed of chemist familiar to the writer (and chemist) Primo Levi who described the founders of the discipline as "unarmed, solitary and on foot...; they did not work in teams, but alone, surrounded by the indifference of their time, generally without profit, and who confronted matter without aids, with their brains and hands, reason and imagination".

Enzo Ferroni was born in Florence in 1921, and he graduated in chemistry from the University of Florence in 1945. Following his appointment in 1954 as Lecturer in Physical Chemistry at his Alma Mater, he rose through the ranks to be, successively, Head of the Institute of Physical Chemistry, Dean of the

Faculty of Sciences and, from 1976 to 1979, Rector of the University of Florence. In 1981 he was appointed Head of the newly instituted Chemistry Department. He also founded the Italian Centre for Colloid and Surface Science, or CSGI (Consorzio Interuniversitario per lo Sviluppo dei Sistemi a Grande Interfase), where he served as President from 1993 to 2006.

Ferroni was not only a leading colloid chemist and a pioneer of science applied to cultural heritage conservation, he was also a man with a unitary vision of culture. He gave lectures on colloids and surfaces, on chemistry applied to the conservation of frescoes, on Leonardo da Vinci's drawings and on the technical story of the caravels in which Christopher Columbus set out to discover the New World. He continued to lecture in physical chemistry at Florence during his three years as Rector – for him the university's pri-

mary function was teaching. "Students are my employers", he would say.

He died exactly 20 years to the day after his dear friend Dino Dini, with whom he had worked with passion and intensity to conserve the works of art of Beato Angelico and of other great Italian painters. Enzo Ferroni's scientific activity could be summarised in Leonardo da Vinci's motto "*Studia la scienza e poi seguita la pratica nata da essa scienza*" ("First study the science, then follow the practice born of that science").

**John Meurig Thomas  
and Luigi Dei**

*Enzo Ferroni, chemist: born Florence 25 March 1921; Professor, Physical Chemistry, University of Florence 1965-96 (Emeritus), Rector 1976-79; President, Italian Centre for Colloids and Surfaces (CSGI) 1993-2006; married 1946 Paola Berchieri; died Florence 9 April 2007.*