


## Report. Drawing Conclusions from Scientific Analyses

 The role of the scientists, Dr. Sergio Ruiz-Moreno and Dr. Alejandro López-Gil Serra, of the Polytechnic University of Catalonia was to investigate the painting by Liubov Popova, *Bottle and Glass* [No. 86], and to report on the pigments used to execute it. Their findings should conclude with a certain number of facts.

Using the purely scientific method and relying on the most recent Raman technology, the scientists established first of all that the pigments found in the painting were in common use during Popova's lifetime. This is an essential and fundamental factor because, in being able to preclude the presence of pigments not available during the artist's lifetime, there can be no discrepancy between the pigments and the painting.

Then adopting the comparative method, Drs. Ruiz and López-Gil discovered that many of the pigments used by the artist in *Bottle and Glass* [No. 86] are also found in other paintings by Liubov Popova. This, in turn, led them to being able to assert that these common pigments are part of the artist's basic palette.

These steps make up the rigorous procedure of the scientist: to observe, to analyse, and to compare using instruments that are of the highest standards and performance. The results are factual and they are definitive.

The role of the scientists was not to argue the case for the authorship of the painting – this had been told to them – or to authenticate it – since the facts about the pigments, their identity, must be set in the context of Popova's stylistic use of them, which is the task of the art historian.

The scientist investigates, providing facts with which the art historian can work, now able to proceed with confidence in order to interpret the function and significance of these facts in a historical and stylistic analysis of the painting.

It is perhaps useful, then, to comment briefly on the points made by the scientists and to indicate what their findings may contribute to an art historical investigation into Popova's painting, *Bottle and Glass* [No. 86].

### “The Pigments Were in Common Use Around 1900...”

This could hardly be more significant for the art historian. In the first instance, the implication is that no pigment found in Popova's painting raises doubts as to it being historically later than what is thought, stylistically, to

be the date of the painting – 1915.

Dr. Ruiz goes to great lengths to substantiate this statement in his annotations to each of the pigments above the graphs, and he reiterates certain facts about the pigments in his Conclusions.

This allows Dr. Ruiz to say that “we can state that [Popova's palette] is a palette typical of, and usual for, the period between 1844 and 1926 both in Russia and in Europe”.

Now this leads to the second instance. For the implication of this statement is that Popova's palette may be compared to those of other painters, for example, to the palettes of the Parisian Cubists. This could reveal what she may have learned from them when she studied in Paris, and perhaps open up a number of new ideas about her Cubist practice.

### “Popova's Basic Palette...”

Drs. Ruiz and López-Gil took eighteen samples of pigments, as indicated by their chart, “Areas Analysed”. These samples revealed the six basic pigments with which Popova executed *Bottle and Glass* [No. 86]. They are, according to the scientists, zinc white, chrome yellow, vermilion, ultramarine blue, Prussian blue, and charcoal black.

Painters always choose their pigments for a reason. Two pigments that are similar in colour may have very different properties: one may give a transparent aspect while another may be quite dense in appearance. So to know about Popova's basic palette gives insights into what she was trying to achieve in *Bottle and Glass* [No. 86]. It also enables the art historian to distinguish certain stylistic features by comparison with other paintings.

### “Comparing Our Findings...”

To establish an artist's palette is a new gift from scientists to art historians. Much work has been done on the paintings of Rembrandt or Van Gogh, for example, but practically nothing has been published on the palettes of Russian Avant-Garde painters.

To compare the findings that are discussed in the exhibition catalogue, *Liubov Popova*, of analyses carried out by the Conservation Department in the Museum of Modern



*Articles from a Dyeworks*, 1914  
Oil on canvas, 71 x 89 cm.  
Museum of Modern Art, New York



*Bottle and Glass* [No. 86]  
Oil on canvas, 54 x 36 cm.  
Galería Manuel Barbié, Barcelona

Art, New York, was the next step. Pigments found in the three paintings analysed by them were also found in the painting analysed by the Spanish scientists. From this information, Popova's broader palette is revealed and indicates what the usefulness of a database of an artist's pigments can provide.\*

A direct analogy may be made between the New York museum's, *Articles from a Dyeworks* of 1914 and *Bottle and Glass* [No. 86] of 1915, whose basic palettes are the same. These are: zinc white, chrome yellow, vermilion, and ultramarine blue.

There are also differences. Prussian blue was not found in the New York painting, while chrome green is found there, and the artist used a different black, ivory black. In addition, Popova added several extenders to her white pigment to give a variety of nuances and depths in the effects.

For the scientist, that the two palettes match, broadly speaking, establishes a coherence between the two paintings. It is for the art historian to assess the meaning of both the coherence and the differences.

### For the Art Historian...

As colour is the place where every painting begins – without colour there is no painting – the art historian is always investigating colour in painting.

Knowing the kinds and qualities of the pigments used may offer insights that confirm or inspire ideas about the colour in the painting: its iconography, structure, function, or meaning. In the case of both *Bottle and Glass* [No. 86] and *Articles from a Dyeworks*, the presence of the very bright chrome yellow pigment introduces a strong element of light into the paintings, while the ultramarine blues reveal areas of shadow which Popova handled in a variety of ways. As chrome yellow is a pigment that is quite heavy, physically (due to its metallic content), its effects may be quite sculptural, making those areas even bolder. How Popova handled the shadows with the ultramarine blue pigment may reveal something about the qualities, position, or direction of the blue areas in the paintings.

The same basic range of colours – red, yellow, and blue – and pigments – vermilion, chrome yellow, and ultramarine blue – link the two paintings. Now there is also a link in terms of subject matter: Popova was using colours and certain pigments to portray light and the action of light in these compositions. That there are additional pigments found in the New York painting suggests that there are differences in the handling of the light, hence in the styles of the two paintings.

The New York painting is Cubo-Futurist, animated and radiating from the centre of the picture plane, light flashing in different directions as well as out of the depths of the composition. *Bottle and Glass* [No. 86] is a Cubist painting that is leading towards Popova's transition to her early *Painterly Architectonics* of 1916. Here the structure is on the vertical and horizontal, the elements fixed in the plane, with light gliding over surfaces.

Because of its dynamism, Popova "needed" more colours and so more pigments in *Articles from a Dyeworks*. She employed zinc yellow and cadmium yellow, red lead, cadmium red, and iron oxides, as well as chrome green in order to capture the animation of the lights and colour nuances.

Thus a comparison of the palettes of these two paintings reveals what it meant for Popova to move from one style to another. Her selection of pigments was coherent with the subject matter and the way she wanted to depict it. Now knowledge of the pigments is contributing to understanding not only the stylistic differences found in the use of colours and subject matter, but also stylistic sequence. This means that information about an artist's palette as it changes may help to date paintings.

Knowledge of pigments, then, is essential to the art historical understanding of colour and style in painting. This knowledge is also giving confidence in works – which is why it is necessary to be aware that the pigments found were in use prior to the supposed date of a painting and may even have been widespread – and in their authentic ageing process. Research into pigments by scientists – and in this case by Dr. Sergio Ruiz-Moreno and Dr. Alejandro López-Gil Serra into Liubov Popova's, *Bottle and Glass* [No. 86], complemented by their comparisons to other paintings by the artist – has provided information that leads to the art historian being able to discover how Popova adapted pigments to specific purposes in her paintings. Now we can appreciate the levels of coherence among pigments, colours, and style in these two paintings by Liubov Popova.

Patricia Railing

\* To say that other painters, for example, Claude Monet or Paul Gauguin, used the same pigments as Russian Avant-Garde painters is to beg the question. For the issue is *how* and *why* certain pigments were used and chosen within a given style. Just as there are twenty six letters in the Latin alphabet with which thousands of words are made in dozens of languages, so there are also a certain number of colours and pigments with which all the paintings through time have been made.