



FULL COLLAR



SUSTAINABLE INNOVATIONS IN ARTWORK CLEANING AND RESTORATION

The cleaning of artworks is a fundamental pillar in the restoration process of a work of art. It involves the use of products that researchers from the GREENART project are working to transform to make them sustainable.

In the practices of art conservation and restoration, two branches stand out: preventive conservation and remedial conservation. The former targets elements external to the artwork, such as its containers, display cases, crates, or boxes, as well as the surrounding air, which can be treated against pollution for instance. Remedial conservation, on the other hand, involves direct contact with the object using materials applied to the artwork to clean, strengthen, or protect it. While strengthening and protective actions add materials to the object, cleaning involves removing layers from its surface. Dust, dirt, biopollution, or patinas from microorganisms are thus eliminated, as well as sometimes aged varnishes or adhesives that can harm the artwork and its appearance when they degrade.

Gels, emulsions, and foams are products used by restorers to carry out cleaning effectively. These are also the focus of efforts by researchers from the GREENART project, involved in the issue of artwork cleaning and restoration, coordinated by Prof. Piero Baglioni and his team at CSGI (Center for Colloid and Surface Science). Among them, David Chelazzi, expert in chemistry and doctor in cultural heritage conservation at the University of Florence and CSGI, explains: “We want to make them green, using green materials, green methodologies. They must become sustainable in all aspects, with non-toxic raw materials and energy-efficient production.” At the core of the entire project, the use of ecological materials involves considering all stages of production of the newly developed products.

Production stages

To successfully develop their products, researchers follow several steps. They must first select and

provide basic components: “This is when we select the best non-toxic and affordable materials,” comments David Chelazzi. Afterwards gels, nanoparticles, films, polymer dispersions are assembled and evaluated in the laboratory, and then with restorers to measure their effectiveness. Then, the team at CSGI, accompanied by Elena Semezin, a doctor in environmental sciences at the Ca’ Foscari University of Venice, and her team, ensures in a new examination the consideration of product requirements at all stages of its life, integrating them with the information produced by all GREENART partners.

Researchers have two paths for manufacturing their products. The first involves taking the best materials manufactured in recent decades and rewriting them using more environmentally friendly components. The second involves creating entirely new systems. “There are many materials available. Waste too, or natural and biological compounds that we can give a new life to,” the researcher reveals. “In reality, the most challenging

aspect is to rethink and recombine these materials, with certain chemical or physical manipulations, which is at the very core of our work.” In the development of these products, each step counts, and their formulation is decisive to achieve effective results.

Green and effective

The criterion of effectiveness is a major element for GREENART researchers, as their new products must surpass what is currently available on the market. This effectiveness depends on both the sensitivity of the surface of the objects to be treated and the versatility of the prepared materials. David Chelazzi explains: “When we use gels to clean artworks, we want to be sure that they can remove dirt or aged varnishes without altering the original pigments and different layers.” Traditional solvent blends can cause the paint to swell or dull the colours; thus, they may require a step-by-step check of dirt removal. On the contrary, the innovative gels developed by GREENART allow for selectivity in removing dirt between the gel and the paint: “It’s a safer and faster process because there is no need to constantly check what we are doing,” comments the researcher.

Traditional methods, in fact, use poorly confined organic solvents, which contain inherent toxicity and are often derived from petroleum-based compounds. Composed of natural, waste-derived or “green” synthetic polymers, the gels developed by GREENART are less toxic. They can also be applied better controlled: “Improving efficiency is not only about the quantity of elements removed from the surface of an object but also about the safety with which they are removed,” notes David Chelazzi. The GREENART gels and cleaning liquids allow for detaching varnishes from the surface rather than completely dissolving them, as traditional methods do today.

Durable products

GREENART’s new materials are greener and more effective. Here, the requirement for sustainability does not compromise its effectiveness; on the contrary, GREENART’s ecological approach goes hand in hand with the proper conservation of cultural heritage: a sustainable conservation over time, environmentally friendly but also respectful of the treated objects. Similarly, the emulsions developed by researchers use water, aiming to maximise cleaning effects while minimising waste.

As for the sustainability criteria of a product, they extend to its entire life cycle. “They must also be safe in their application and use by restorers, conservators, and all possible users,” explains David Chelazzi. “We not only want to use innovative and effective materials but also make them, as far as possible, affordable for users. And in general, offer a quality significantly superior to reference products on the market for the same price.” Beyond an obvious ecological dimension, GREENART’s new products must also meet safety standards, providing non-toxic formulations, as well as financial criteria by being affordable. For them to be sustainable, their prices should not be too high. “Or, they must be justified by a very high quality of the material and long-lasting effectiveness, over fifty, a hundred years,” comments the researcher.

Cross-cutting benefits

If the world of art conservation and restoration seems limited compared to the scope of the project, it’s because the efforts made by researchers are not confined to this single domain. Here, it is also a matter of social well-being, preserving the identity of a society through its material goods, and facilitating future generations’ access to artworks, endowing the sustainable approach advocated by GREENART with symbolic value. And in a more concrete perspective,

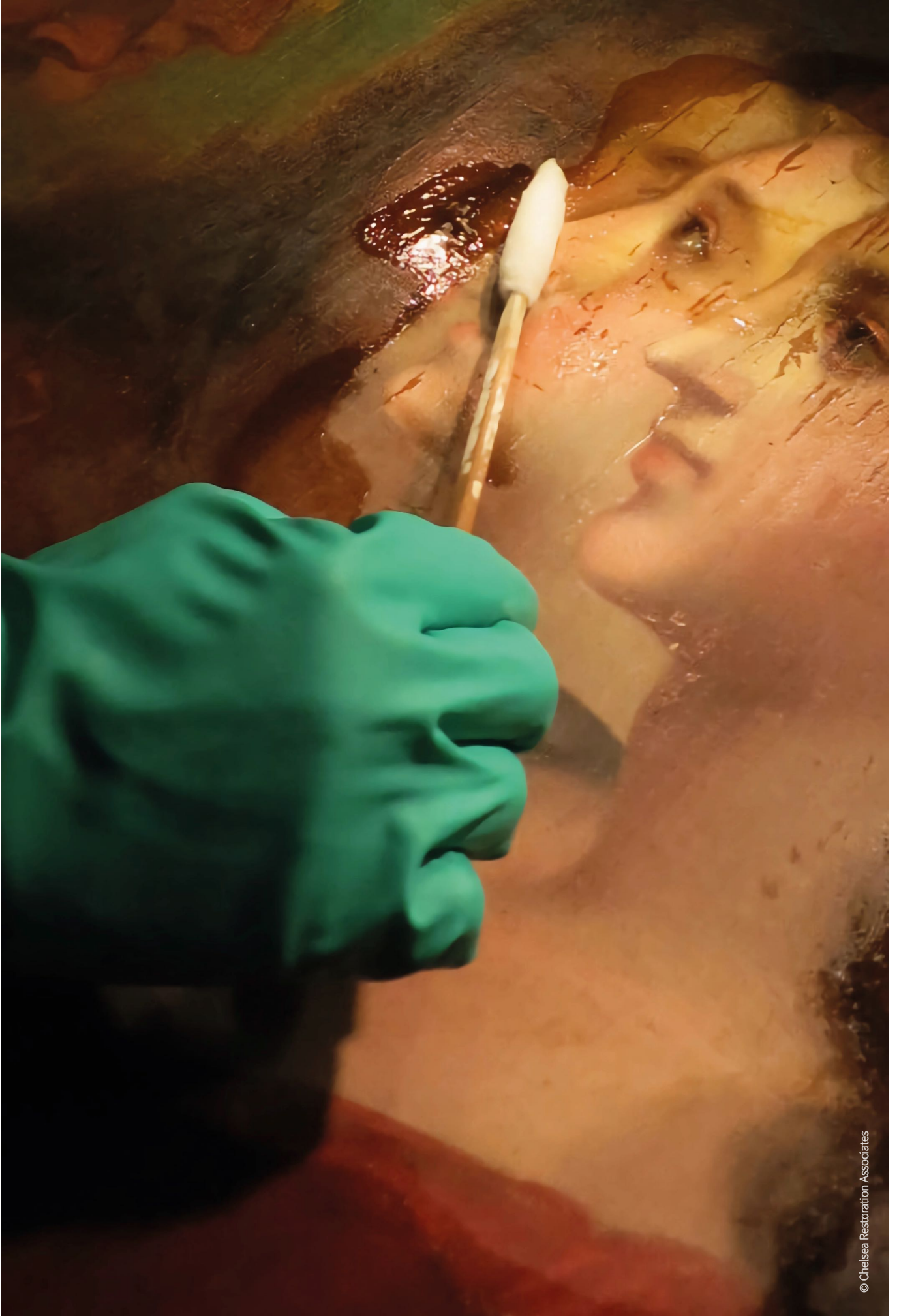
the solutions provided by the scientists could extend to other scientific and technological fields.

If the developed materials can be transferred to other sectors, the same applies to the methodology followed by GREENART. The development of the life-cycle assessment method, in particular, allows for harmonising green standards: “The scientific framework we are developing and the ecological methodology we are following can be used for the food, pharmaceutical, or cosmetic industries,” notes David Chelazzi. The scope of research for the green conservation and restoration of artworks thus goes far beyond this single field.

Towards the transmission of the green approach

In the field of research in cultural heritage conservation, the question of sustainable development is receiving increasing attention. While already in the 1970s, a handful of scientists began to delve into the subject, research has gained momentum in the last fifteen years, with an acceleration in the last five years. “We didn’t exactly start from scratch,” comments David Chelazzi. “Cleaning, in particular, is one of the areas in which the CSGI had the most experience, so we are well advanced.”

Currently, the CSGI team and research groups in GREENART are completing evaluations of their products in the laboratory, which will soon be tested by restorers. Their use differs from traditional tools due to their physico-chemical mechanisms; hence, professionals will also need to be trained. A decisive step, which also poses a challenge for GREENART. As not all users of these products are scientists, it will also involve offering workshops and meetings with restorers to raise awareness of these new products. “And for people to trust us, we also have to show that what we are currently developing really does work,” concludes David Chelazzi.





EX PRESSA DONO DEDIT NOBIL
PRÆSIS G. V. PAPENBURGCK.

ISSIMVS. TVDIC VINCAMISTELAEDAMENSIVMLOYONDA
K. IAN. CIOIOCCXLIII.





PASSIONATE ABOUT ART?
SUBSCRIBE TO AMA.

It's free!

subscribe.artmediaagency.com

DELEGATE YOUR ART
CONTENT PRODUCTION
TO AMA.

Simple... There's nothing better!