



SOLVENT-FREE OIL PAINTING USING TRADITIONAL MATERIALS

by Tad Spurgeon, author of [*Living Craft*](#).

BACKGROUND

Studying the texts written about oil painting over the last five centuries shows that there have been many basic technical systems used. This is confirmed by the more recent findings of technical art history. Currently, many painters have been taught that solvent is necessary for oil painting. This came about as a result of the 19th century German medium of damar varnish, stand oil, and turpentine that was adopted by Ralph Mayer in *The Artist's Handbook of Materials and Techniques*, a textbook that became the standard technical reference of the second half of the 20th century in English. Many aspects of this book's version of oil painting begin to feel limited when viewed in relation to the more recent findings of technical art history. But the focal issue for the health and safety of painters is the book's ubiquitous and unnecessary use of toxic solvents.

Solvents are toxic due to the action of their volatile organic compounds (VOCs) on the central nervous system. Long term solvent use in an unventilated studio leads to significant health issues, Denmark has in fact labeled this "Painter's Dementia." "Odorless" mineral spirits is sometimes promoted as "safe," but it is still evaporating into the room. In other words, a solvent that works is a solvent to beware of. Sometimes citrus thinner or spike lavender are promoted as "healthy" or "organic" because they are plant-derived and don't tend to give people headaches, but this is irresponsible and dangerous: both of these have very high aromatic content. Working in an unventilated studio with solvent over long periods of time is known to cause significant health problems. There are safe, soy-based solvents now for cleaning brushes, but there is no such thing as a safe solvent that can be used for the painting itself.

Solvent is necessary to clean brushes when a soft resin varnish is used in the medium. And solvent is part of the traditional way damar, or any soft resin, is dissolved. So, in the 20th Century academic method, solvent is necessary. But this is *one* method, not *the* method. There is no instance in the thirty-three National Gallery Technical Bulletins of the global use of resin in the paint by any well-known older painter: global use of resin begins to appear in 19th century practice, but is not, for example, part of Impressionist technique. Older painters kept their brushes in oil, not solvent, this is documented in several older paintings, and the use of solvent by Rubens was discussed by De Mayerne as an innovation. Damar does not need to be dissolved in solvent, a small amount can be ground and gently heated into the oil used in the medium at a relatively low temperature, about 248° F, just higher than the boiling point of water.

Many painters develop intolerance to solvents due to prolonged exposure over time: headache and nausea are typical symptoms. Because solvent use is taken for granted, solvent danger is played down by the marketplace. At the same time, health-conscious painters have created a demand for water-based oils. This is an example of unnecessary complexity brought on by painters being close to the marketplace, but far from the basic tenets of their craft. Below is an overview of several methods for working with mainly traditional materials that use no solvent or, in the case of the Strasbourg Method, a minute amount.

THE PUTTY MEDIUM

Damar in solvent provides an element of grab to the medium, but this can also be supplied by ground chalk, found in the paint of Rembrandt, or ground calcite, found in the paint of Velasquez. A simple mixture of calcium carbonate and pre-polymerized oil, the putty medium is the basis of the system of both Rembrandt and Velásquez. It offers a simple yet incredibly versatile and stable method of creating any style from smooth to broken surface painting by varying the consistency and type of ingredients used. Putty can be made on the palette from chalk and oil, or made in larger quantities and tubed. When beginning, it's best to simply use chalk and oil, get used to the way they interact, the various rheologies available. On panels, paint can be cut with any density of putty to any degree, the color becomes lighter but without the loss of saturation that results from cutting color with white. On canvas, it is best to keep the chalk or marble dust at ten to fifteen percent range of the total paint film. This allows for more apparent color from a low chroma palette. Stronger colors can be cut with more putty, although a good standard proportion is one part putty to one part paint. The mix of oil used to make the putty can be customized for specific purposes. Because the oil used to make commercial tube paint is always raw, it is important to make the putty with pre-polymerized oil, this results in a stronger and more stable paint film. A simple method involves heating the oil in a Crockpot or small deep-fryer to 100°C - 150°C. The oil can take long periods at 100°C, at 150°C four hours is enough, eight hours begins to create a noticeably denser oil. Small additions of thicker oil such as sun oil or burnt plate oil give the puttied paint more saturation. Small amounts of egg white can also be incorporated into putty. This creates seizure, which is then be softened by more oil. The result is a putty which is richer but also moves better making a more mobile quality of impasto. There are many types of chalk and marble dust to choose from. Fine cristobalite, a variety of quartz, will also change the way the putty moves. Exploring these additions is interesting but, at least in my experience, none of them represents a quality of change that is crucial.

THE SILICA GEL MEDIUM

A modern gel medium based on industrial fumed silica, sand which has been heated to a very high temperature. The Venetian painters are documented as having used ground river silica pebbles in their paint as an extender, this medium provides a modern, more transparent way of using pure silica. The oil or combination of oils is simply mixed into the silica, a stable transparent gel forms, the gel can then be used or larger quantities tubed. Many slight differences in working character can be built into a silica gel: more or less movement, hard or soft edges, thick or thin impasto, all depending on the ratio of silica to oil and the type of oils used. Again, when using commercial tube paint, it's important to make sure all the oil is pre-polymerized in some way for a stronger and more stable paint film. The silica gel mediums are a good counterpoint to the putty mediums: the silica gels being more about movement, or slide, the putties being more about hold or stick. Fumed silica is very light and fine. This material should be handled with care when dry using a good particle mask. Once in the tube it presents no issues.

FUSED BALSAM-OIL MEDIUMS

Many of the older paintings examined by London's National Gallery in their annual Technical Bulletins show instances of a medium that uses preheated oil and a small amount of pine resin. Painters are accustomed to using Canada balsam or larch turpentine as damar replacements, it's also simple to fuse these resins into an oil medium for a material that is even more stable over time. The paint film is so sensitive that even at a ratio of one part resin fused into nine parts oil, the presence of the resin is noticeable in both the working qualities and the

look of the paint. A small amount of the chosen mixture of resin and oil is simply heated with rapid stirring over medium heat. The mixture at first is cloudy. The resin component will begin to smoke fragrantly before the oil component, and the mixture clears. Once the oil component begins to smoke, the process is finished, it is possible with practice to stop the process earlier. The important thing is that the solution remain clear on cooling. If it becomes cloudy or separates, it wasn't heated enough. There is some darkening of the medium in this procedure, between honey and amber color, but it is inconsequential in practice. This medium tends to dry harder, with less residual stickiness, than using the resin raw. This system works well for thinning paint cut with the putty medium in thinner or finer painting styles. Brushes used with this medium can be cleaned and stored in oil.

DAMAR, WAX, AND OIL

Both damar and beeswax are often dissolved in solvent before being incorporated into a medium. But both of these materials can be dissolved in the oil itself. Damar dissolves at a higher temperature, once it is in solution the pan can be removed from the heat and beeswax pellets can be added. A concentrate can be made up, dissolving damar and wax into stand oil, for example, and used as a conditioning medium in very small amounts, see *The Strasbourg Method*, below. On canvas, between five and ten percent damar can be dissolved in an oil mix, and between two and five percent wax. Percentages of damar and wax can be somewhat higher on panels.

THE STRASBOURG METHOD

This method comes from a 14th or 15th Century manuscript found in a library in Strasbourg and was translated by Eastlake in the first volume of his classic *Methods and Materials*. In this method, a very small amount of a hard resin, cooked oil varnish such as amber or copal is mixed into each color on the palette before painting begins: the recipe specifies “a drop or two”. The addition of the resin varnish causes the paint to seize, more apparent in some colors than in others, more apparent in artist made paint than in commercial paint, perhaps most apparent generally in lead white. A very small amount of the resin by volume is enough, between 2 and 4 percent, and results in a moderate surface shine when the paint dries. More resin will in fact result in a surface that is too closed or shiny to be painted on without first being ground down with sandpaper or a form of grit in oil. Amber and copal varnishes are typically sold with a significant solvent content, but the amount used is small compared to other solvent methods, and the brushes can still be cleaned with and kept in oil. The Strasbourg Method can be combined with any of the mediums listed above, it works particularly well with the putty medium and the silica gel medium for increasing saturation in later layers of the painting, or for a more spontaneous *alla prima* approach with overall impasto.

BRUSH CARE

Using the above methods, brushes are kept on their sides in a small glass or ceramic tray partially filled with oil. Brushes stored in oil become more flexible and responsive. This is especially the case with bristle brushes, which can do much more when nourished by oil than when repeatedly desiccated by solvent. The tray can be tilted with a block beneath one end so less oil is in play at any time, makes things less messy. The best oil to use is a commercially refined walnut oil such as Spectrum Naturals. This is a drying oil, but does not dry quickly. Refined safflower, sunflower, or grapeseed oil can be used, but brushes must be wiped well before painting to avoid the accidental introduction of longer open times. Avoid oil with an added anti-

oxidant. Brushes should be somewhat clean before going into the oil but can be thoroughly cleaned on the rag the next day before painting begins again. These methods are all relatively rag-intensive, when using linseed oil rags should *always* be spread out separately to dry. Rags should never be left in a pile due to the danger of spontaneous combustion from the oil as it polymerizes. At a certain point, usually every few months depending on ambient temperature, the oil in the tray will begin to get either too full of pigment or too dense to clean the brushes quickly. The tray is then wiped out and re-filled with clean oil. If brushes become clogged with thicker oil, they can be washed with vegetable oil soap and water. More stubborn oil can be released with a rinse in washing soda, sodium carbonate, but brushes should not remain immersed in this for long.

For more innovative technique based on traditional practice, please visit [Living Craft](#). This book explains many things that have not been explained before, and contains many traditional materials and methods that have not been documented before. It is a technical book with a soul.

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